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Final

ENVIRONMENTAL ASSESSMENT
for Termination of Lease and the Transfer of Property Back to the Landowner for the Matagorda, Texas Tethered Aerostat Radar System (TARS) Site

January 2010

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ACRONYMS AND ABBREVIATIONS

ACAM	Air Conformity Applicability Model
ACM	Asbestos-Containing Material
AEP	American Electric Power
AFI	Air Force Instruction
AFPD	Air Force Policy Directive
AST	Above-ground Storage Tank
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CONR	Continental North American Aerospace Defense Command Region
CWA	Clean Water Act
DoD	Department of Defense
EA	Environmental Assessment
EAC	Early Action Compact
EDR	Environmental Data Resources
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
EPA	United States Environmental Protection Agency
ERP	Environmental Restoration Program
ESA	Endangered Species Act

FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
gpm	Gallons per Minute
HVAC	Heating, Ventilation, and Air Conditioning
LBP	Lead Based Paint
MBTA	Migratory Bird Treaty Act
mg/L	Milligrams per Liter
MSDS	Material Safety Data Sheets
NAAQS	National Ambient Air Quality Standards
NCSS	National Cooperative Soil Survey
NDD	Natural Diversity Database
NEPA	National Environmental Policy Act
NOTAM	Notice to Airmen
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
OAQPS	Office of Air Quality Planning and Standards
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
PCi/L	Picocuries per Liter

PEM1C	Palustrine, Emergency, Persistent, Seasonally Flooded wetland
PEMf	Palustrine, Emergent, Farmed wetland
PF01A	Palustrine, Forested, Broad-Leaved, Temporarily Flooded wetland
POL	Petroleum, Oil, and Lubrication
PUBFx	Palustrine, Unconsolidated Bottom, Semi-Permanently Flooded, Excavated wetland
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SSC	Species of Special Concern
TARS	Tethered Aerostat Radar System
TCEQ	Texas Commission on Environmental Quality
TDLR	Texas Department of Licensing and Regulation
THC	Texas Historical Commission
TPWD	Texas Parks and Wildlife Department
Tpy	Tons Per Year
TSHA	Texas State Historical Association
TWDB	Texas Water Development Board
US	United States
USAF	United States Air Force
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
UST	Underground Storage Tank

FINDING OF NO SIGNIFICANT IMPACT

1.0 NAME OF THE PROPOSED ACTION

Environmental Assessment (EA) for the proposed action to terminate the lease and transfer the Matagorda Tethered Aerostat Radar System (TARS) Site located in Matagorda County, Texas, to the landowner with the existing structures, utility systems, pavements, and fences remaining in place.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

An EA was prepared to evaluate the potential environmental impacts of the full implementation of the Proposed Action.

Proposed Action
The Proposed Action includes terminating the lease and returning the Matagorda TARS Site to the landowner, Braman Ranches LLC., with all existing structures, utility systems, and pavements remaining in place. Under this action, all solid waste, debris, maintenance equipment, office equipment, and tools will be removed from the site. In addition, the Air Force will mow the property prior to the transfer of property.

Alternative A
Under Alternative A, the Air Force proposes to demolish the TARS Site located in Matagorda, Texas, and to restore the property to its original configuration. This would include the removal of the buildings and site infrastructure. In addition, it would involve potential earth disturbance over a substantial portion of the site. However, the majority of the disturbance is expected to be insignificant, only involving approximately the top foot of soil, except where foundations, underground utility lines, and manholes are removed.

Alternative B (No-Action Alternative)
Under the No-Action Alternative, no change would occur at the Matagorda TARS Site. The USAF would continue to lease the property. The site would remain in cold storage, employing no personnel, except contract grounds maintenance and security personnel. The environmental and socioeconomic conditions would remain unchanged, and the government would continue making lease payments to the owner of the property.

3.0 ENVIRONMENTAL IMPACTS

In general, no significant impacts were identified during the evaluation of the proposed action. The following resources and infrastructure requirements were identified and evaluated as having no significant impact with implementation of the Proposed Action:

Resource and Infrastructure	Potential Impact
Land Use, Visual Resources, and Recreation	• There would be no change from current conditions.
Socioeconomics and Environmental Justice	• There would be no long-term significant effects; temporary negative effect due to the maintenance and security personnel's loss of jobs
Cultural Resources	• No known cultural resources exist on the site, so none would be affected.
Infrastructure	• No change of infrastructure from current conditions; solid waste would be removed from the site.
Physical Resources	• There would be no change from current conditions.
Hazardous Materials and Hazardous Waste	• There would be no significant effects; any hazardous materials or waste present at the site would be disposed of under the requirements of CERCLA.
Biological Resources	• There would be no change from current conditions.
Air Quality	• There would be no significant effects; air emissions resulting from maintenance and security personnel transportation to work would be eliminated upon transfer of property.
Air Space	• There would be an effect to the airspace above the site, since the restricted airspace would no longer be needed.

4.0 CONCLUSION

Based on information and analysis presented in the Final Environmental Assessment, which is hereby incorporated by reference, and conducted in accordance with the requirements of the National Environmental Policy Act, the Council on Environmental Quality regulations, and implementing regulations set forth in 32 CFR 989 (Environmental Impact Analysis Process), as amended, and review of the public and agency comments submitted during the 30-day public comment period, I conclude that implementation of the Proposed Action would not result in significant impacts to the quality of the human or natural environment. For these reasons, a finding of no significant impact (FONSI) is made and preparation of an Environmental Impact Statement (EIS) is not warranted.

DIMASALANG F. JUNIO, Colonel, USAF
Chief, Programs Division (A7P)

8 Mar 2010
Date

EXECUTIVE SUMMARY

The purpose of this Environmental Assessment (EA) is to assess the potential environmental effects that may occur from vacating the leased property located in Matagorda County, Texas, formerly used as the Matagorda TARS Site. The property would be returned to the landowner, Braman Ranches LLC (Victoria, TX), with the existing structures, utility systems, pavements, and fences remaining intact.

An EA assesses the possible effects - positive or negative - that a Proposed Action may have on the environment, considering natural, social, and economic aspects. The purpose of the assessment is to ensure the Air Force considers the ensuing environmental effects to decide whether to proceed with the Proposed Action.

The purpose of the Proposed Action is to return the Matagorda TARS Site to the landowner with the existing structures, utility systems, pavements, and fences remaining in place. As part of the Proposed Action, all solid waste and debris would be removed. In addition, the site would be cleaned and mowed prior to transfer to the landowner.

The Matagorda TARS Site was active from May 1994 to October 2002. However, in October 2002, the site was no longer needed and was placed in cold storage. The site remains inactive and is in cold storage.

This EA has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, (42 United States Code 4321-4347), Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and 32 CFR Part 989, et seq., Environmental Impact Analysis Process (formally known as Air Force Instruction 32-7061).

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1.0 PURPOSE AND NEED

1.1 INTRODUCTION

The purpose of this Environmental Assessment (EA) is to assess the potential environmental effects that may occur from vacating the leased property located in Matagorda County, Texas, formerly used as the Matagorda TARS site. The property would be returned to the landowner, Braman Ranches LLC, with the existing structures, utility systems, pavements, and fences remaining in tact. This EA has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, (42 United States Code 4321-4347), Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and 32 CFR Part 989, et seq., Environmental Impact Analysis Process (formally known as Air Force Instruction 32-7061).

The Tethered Aerostat Radar System is an aerostat-borne radar. Its primary mission is to provide radar data in support of other federal agencies involved in the nation's drug interdiction program. This program consists of multiple land-based low-level radar surveillance aerostats along the United States (U.S.) southern border and Mexico, the Straits of Florida, and the Caribbean. Each aerostat is a large fabric envelope filled with helium that can reach altitudes up to 15,000 feet. The four main parts of the aerostat are the (1) hull and fin, (2) windscreen and radar platform, (3) airborne power generator, and (4) rigging and tether (Figure 1-1). The hull of the aerostat consists of an upper and lower chamber that is separated by a gas-tight fabric partition. The upper chamber is filled with helium, which gives the aerostat lifting capability. The lower chamber is a pressurized air compartment, referred to as a ballonet. The ballonet pressurizes the helium chamber to maintain aerostat hull integrity. The radar platform is located in the windscreen compartment. The airborne power generator consists of an airborne engine control unit that drives the generator, and a 100-gallon diesel fuel tank that supplies the generator. The rigging consists of flying suspension lines that are connected to the main tether, and mooring suspension lines.

In 1981, the Federal Aviation Administration (FAA) advised Customs to begin seeking out aerostat sites along the southwest border and the gulf. By 1984, the requirement for the Tethered Aerostat System network was established by Customs to help counter illegal drug trafficking. In 1987, Customs began seeking proposal requests from contractors for these aerostats. In April 1990, Customs entered into a lease agreement with D.H. Braman III (Refugio, Texas), Joseph W. Braman (Refugio, Texas), and D.H. Braman Jr. (deceased) for a piece of property within Matagorda, Texas. Construction for the Matagorda TARS Site began in May 1992. The U.S. Air Force Air Combat Command assumed responsibility for the system in 1992. In May 1994, the Matagorda TARS Site became active. However, in October 2002, the site was no longer needed and was placed in cold storage. At this time, the aerostat radar was removed from the site. Currently, the Matagorda TARS Site remains inactive and employs no personnel, except contract grounds maintenance and security personnel.

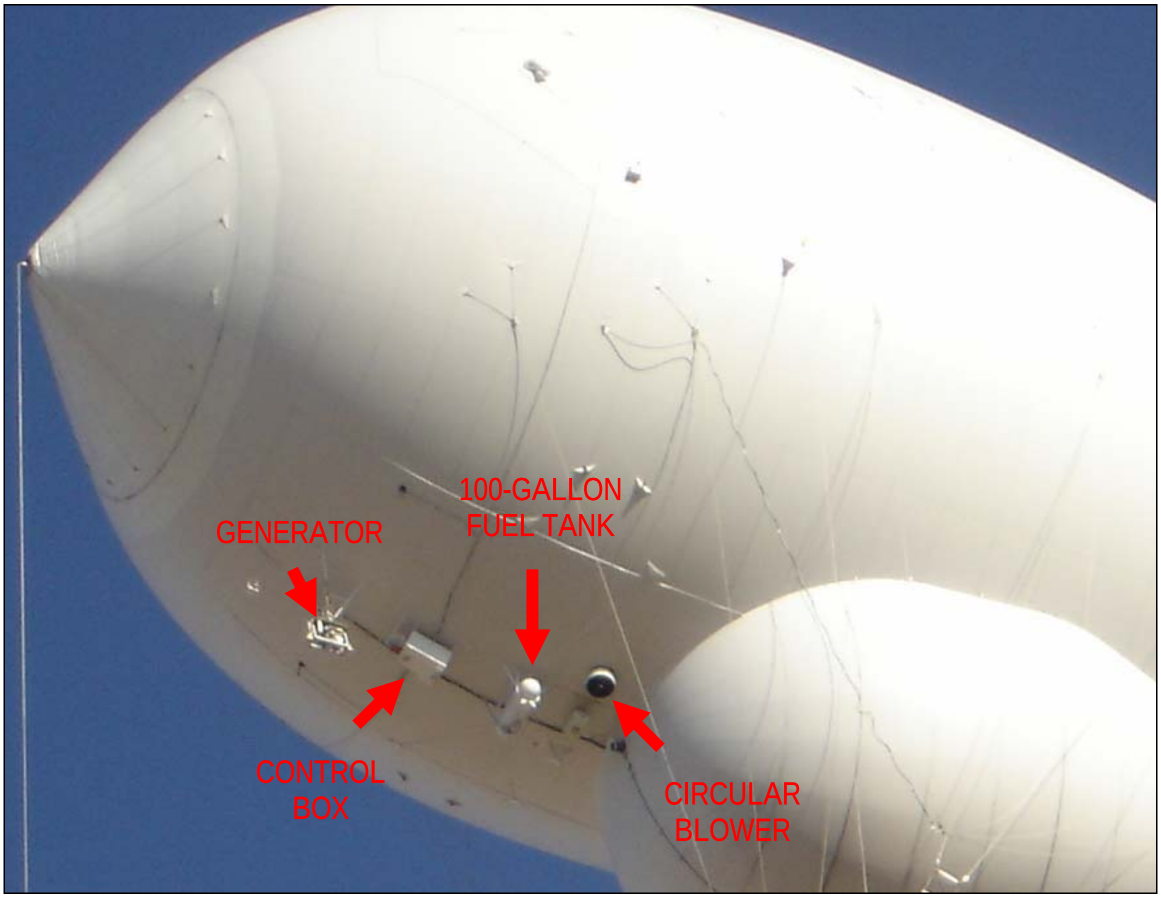


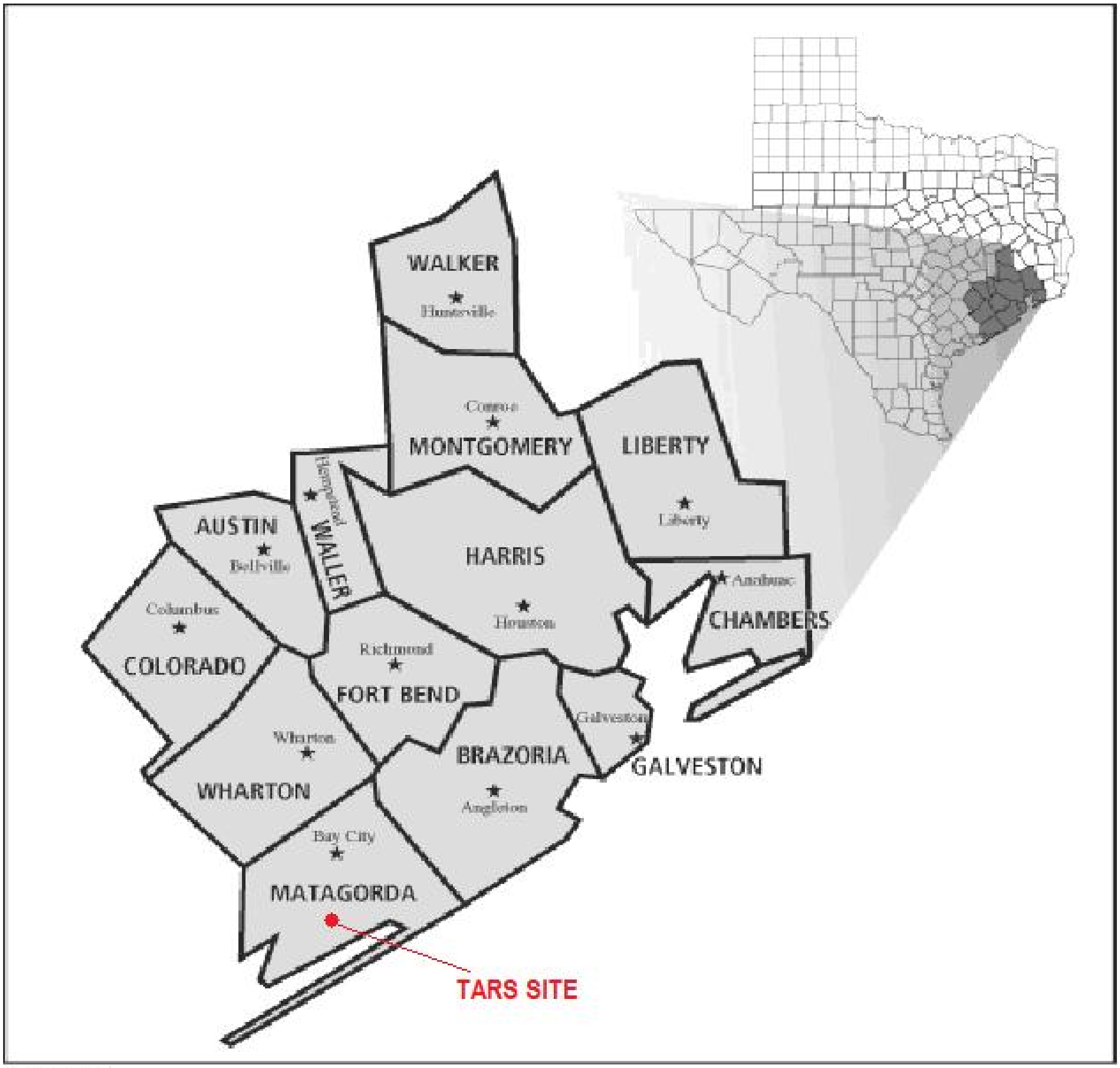
Figure 1-1
Underside of the Aerostat Radar

1.2 BACKGROUND

The Matagorda TARS Site is located along the gulf coast of southeastern Texas within Matagorda County (Figure 1-2). The site comprises approximately 23 acres configured in a 1,000-foot square, which is located within a larger 2,055-acre tract of land. The Matagorda TARS Site is located approximately 1-1/2 miles northeast of Matagorda, Texas on Highway 60 (Figure 1-3).

The TARS Site includes the following structures: the Operations Building, Maintenance Garage Building, Payload Service Building, Water Tank and Pump Storage Building, Guard House, and the Hazardous Materials Storage Buildings. These structures are located on the eastern portion of the site. The center of the site consists of the concrete launching pad and the mooring system for the aerostat. The aerostat and associated TARS equipment is not currently present onsite. Figure 1-4 shows the layout of the Matagorda TARS Site.

In October 2002, the Matagorda TARS Site was deactivated and went into cold storage. It currently remains inactive.



★ = County Seat

Source: Adapted from Window on State Government (http://window.state.tx.us)

Figure 1-2
State of Texas, Matagorda TARS Site Location

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Source: Rand McNally

Figure 1-3
Location of Matagorda TARS Site within Matagorda, Texas

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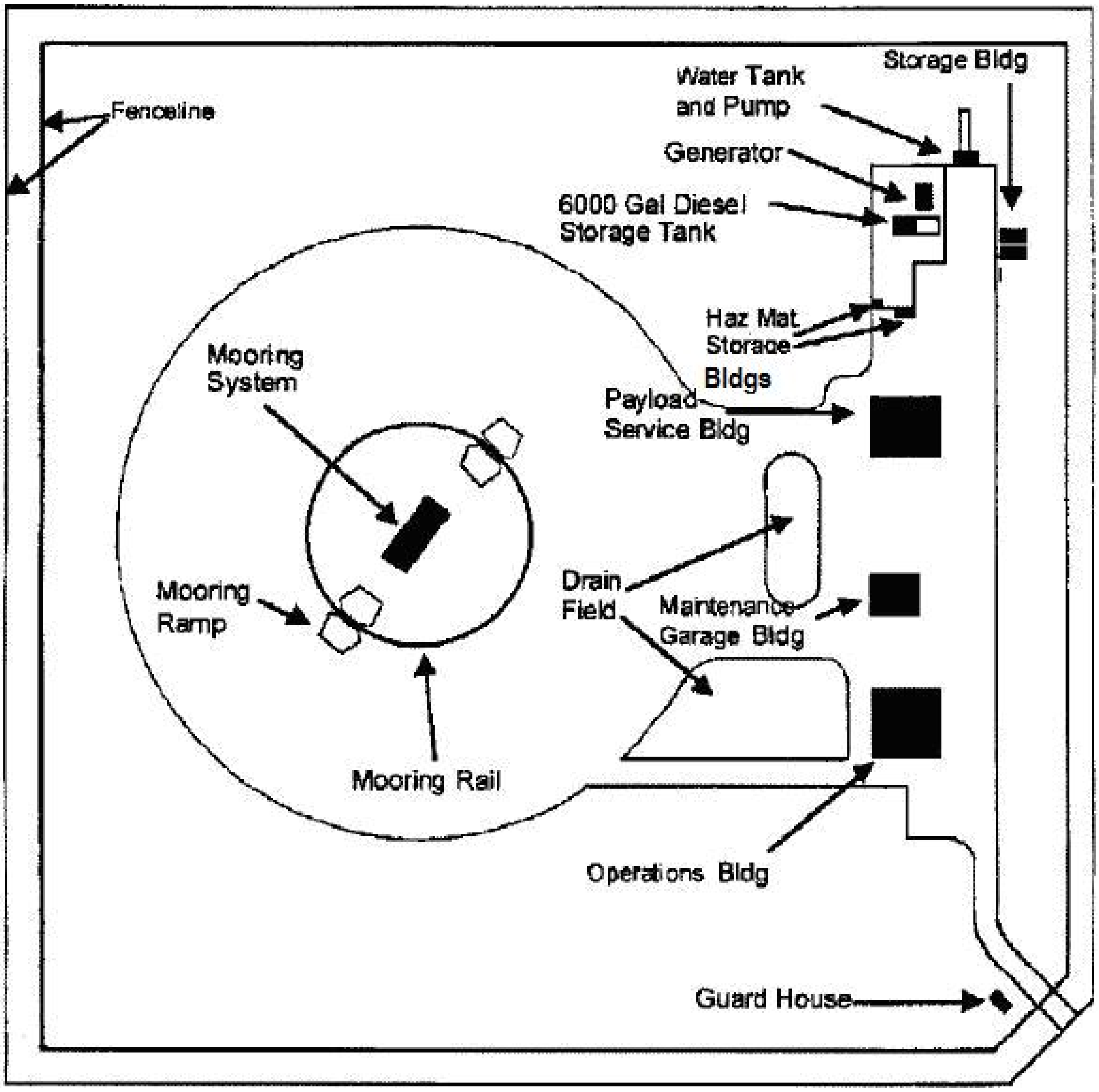

Source: USAF 2000 Final EBS for Matagorda, TX TARS Site

Figure 1-4
Tethered Aerostat Radar System (TARS) Site, Matagorda, Texas

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1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to return the Matagorda TARS Site to the landowner with the existing structures, utility systems, pavements, and fences remaining in-place. As part of the Proposed Action, all solid waste and debris would be removed. In addition, the site would be cleaned and mowed prior to transfer to the landowner. The facility has been in cold storage for seven years and is no longer needed. Therefore, managing and maintaining this site is ineffective and an inefficient use of Government resources. The Government desires to terminate the lease, and discontinue ground maintenance and security for the facility.

The Matagorda TARS Site has been deactivated since October 2002 and has remained in cold storage for the past seven years. The Proposed Action will not adversely affect the TARS program objectives.

1.4 ORGANIZATION OF THE DOCUMENT

This EA is organized into seven chapters plus appendices. *Chapter 1* includes background information and explains the purpose and need for the Proposed Action. *Chapter 2* provides a detailed description of the Proposed Action and alternatives. *Chapter 3* contains a description of the existing conditions at the Matagorda TARS Site. *Chapter 4* provides a description of the potential environmental consequences of implementing the Proposed Action. *Chapter 5* is a discussion of the potential cumulative effects and irreversible and irretrievable commitment of resources. *Chapter 6* contains a list of preparers for the EA. *Chapter 7* includes a list of references used in preparing the EA. *Appendix A* contains scoping letters sent to various state and federal agencies, along with responses from these agencies. *Appendix B* contains photographs of the Matagorda TARS Site. *Appendix C* contains the hazardous materials inventory for the Matagorda TARS Site. *Appendix D* includes a report on the recycling of concrete containing lead-based paint. *Appendix E* contains the EDR Radius Map Report with Geocheck. *Appendix F* contains various site inspection documents, including the 2000 EBS for the Matagorda TARS Site, the 2000 EA for the Matagorda TARS Site, and the Pollution Incident Report for a spill that occurred onsite in 1999 and was subsequently cleaned up. *Appendix G* is a list of threatened and endangered species found in Matagorda County, Texas. *Appendix H* contains additional documents that were used in the preparation of this EA, including the Soil Survey of Matagorda County, information on the Gulf Coast Aquifer, information on the threatened and endangered species found in Matagorda County, and erosion control best management practices. *Appendix I* includes a review comment matrix that outlines the public and government review comments received at each stage of the EA, and their corresponding responses. *Appendix J* contains projected air emission calculations for demolition of the Matagorda, TX TARS Site.

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2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED FEDERAL ACTION

The Proposed Action includes returning the Matagorda TARS Site to the landowner, Braman Ranches LLC, with all existing structures, utility systems, pavements, and fences remaining intact. All buildings currently on the site would remain on the site, including the Operations Building, Maintenance Garage Building, Payload Service Building, Guard House, Water Tank and Pump House, Hazardous Materials Storage Buildings, and the generator shed. In addition, the aerostat mooring system, concrete launching pad, septic tank, leach fields, generator, water storage tank, diesel storage tank, water well, and all fencing around the perimeter of the facility and on the facility would remain in place. All electrical and water lines would remain including the telephone/power poles, underground electric duct banks, armored cables, water and sewer pipes, metal drainage pipes, and telephone cables. In addition, all roads, sidewalks, parking areas, curbs, and gutters would remain in place.

The Air Force would contract out personnel to remove all solid waste and debris from the facilities prior to implementation of the Proposed Action. In addition, all maintenance equipment, tools, and office equipment would also be removed. Included in the Proposed Action, the Air Force will clear the grounds of debris, and ensure grass is cut prior to transfer.

2.2 ALTERNATIVE A

Under this Alternative, the Air Force proposes to demolish all facilities and restore the site to its original configuration. Prior to any demolition activities, Occupational Safety and Health Administration (OSHA) Standard 1926.850(a) requires that an engineering survey be conducted. The engineering survey is not required prior to completion of this EA, but is needed if Alternative A is implemented, prior to any demolition activities. This survey will determine the condition of the framing, floors, and walls of all structures that are to be demolished. This survey will allow measures to be taken, if necessary, to prevent the premature collapse of any portion of the structures. As part of this survey, it shall be determined if any hazardous chemicals, gases, explosives, flammable materials, or similar dangerous substances exist or have been used on the site. In cases where the nature of a substance cannot be determined, samples will need to be taken and analyzed prior to demolition activities.

All electric, gas, water, steam, sewer, and other service lines would be shut off, capped, or otherwise controlled before any demolition work commences. Each utility company that is involved would be contacted in advance for their approval or services. If any utility lines require maintenance during demolition, these lines would be temporarily relocated and protected. In addition, the location of all overhead power sources would be determined to avoid any accidents.

2.2.1 DEMOLITION ACTIVITIES

As part of the demolition activities, all buildings would be demolished, as well as any wood, steel, concrete, elevated slabs, footings, or foundation associated with each of the buildings. In addition, all heating, ventilation, and air conditioning (HVAC) systems would also be removed

from each of the buildings, as well as all circuit breakers. There are seven circuit breakers in the Operations Building, one in the Vehicle Maintenance Building, one in the Payload Service Building, one in the Security Building, and two in the Mechanical Building. There are three transformers on-site (one in the Operations Building, one in the Payload Service Building, and one in the Mechanical Building); these would also need to be removed from the site.

Within the Operations Building is a dishwasher hood that would be cleaned and disposed. In addition, the following items are located in the Operations Building that would be discarded: one shower stall and receptor, three water closet fixtures, three single-compartment sinks, one double-compartment sink, one wall-mounted urinal, and one water heater. Within the Mechanical Building, a water well shall be closed in accordance with the State requirements and a light control panel would be demolished. Also located on the site, is a fuel spill container in which the pavement, concrete, and curbs would be demolished. In addition, the mooring system and blockhouse that is located on the aerostat pad will also need to be demolished.

Any utility systems found on the Matagorda TARS Site would also be demolished. For example, the surface raceway on the telephone/power poles and the high-pressure sodium fixture would be removed from the exterior lighting areas. The primary and secondary underground distribution lines would be demolished, including any underground electric duct banks or armored cables. All water and sewer piping and fittings would be removed, as well as any metal drainage piping associated with the storm drainage system. The security alarm system would also be discarded.

Additional items that would be removed include all radio towers, the security fence (including removal of chain-link posts, fabric, and barbed wire), any conduits or cables associated with the telephone duct facility, aluminum street signs, the emergency electric power generation plant, the diesel storage tank, all sewage septic tanks, and any pavement, curbs, or concrete associated with the roads and parking areas.

During demolition activities, a silt fence would be installed. A silt fence is a temporary sediment barrier made of synthetic filtration fabric supported by steel or wood posts. The purpose of a silt fence is to prevent sediment carried by sheet flow from leaving the site and entering at drainage ways or storm drainage systems by slowing storm water runoff and causing the deposition of sediment at the structure. In addition, seeding of the entire site within the security fence would be accomplished.

2.2.2 RESTORATION ACTIVITIES

Following demolition, restoration activities would be accomplished at the Matagorda TARS Site. This would include landscaping and site development. To remediate the earth, fine grading for loam or topsoil would take place. Fine grading is precise grading of ground after rough levels have been reached, to prepare for seeding and planting. In addition, seeding of the entire site within the security fence would be accomplished.

According to the Texas Parks and Wildlife Department (TPWD) (Appendix A), revegetation activities should include planting a mixture of native herbaceous species. Native perennial grass species preferred by TPWD for permanent cover include switchgrass (*Panicum virgatum*),

eastern gamagrass (*Tripsacum dactyloides*), Virginia wildrye (*Elymus virginicus*), Canada wildrye (*E. Canadensis*), yellow Indiangrass (*Sorghastrum nutans*), and little bluestem (*Schizachyrium scoparium*). To ensure revegetation is successful, monitoring the site for at least two years following revegetation would be conducted.

2.3 ALTERNATIVE B (NO-ACTION ALTERNATIVE)

Under Alternative B (No-Action Alternative), the Air Force would continue to maintain the facility in caretaker status. The Air Force would continue leasing the property from Braman Ranches LLC. Caretaker status at the Matagorda TARS Site includes the basic custodial services required to maintain the site at a level that provides safety, security, and environmental protection. This includes maintaining the grounds, ensuring the site and facilities are properly secured, and performing weekly inspection visits to determine the site's condition.

2.4 REGULATORY COMPLIANCE

This EA has been prepared in accordance with the requirements of the NEPA of 1969, (42 United States Code 4321-4347), Council of Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508), and 32 CFR Part 989, et seq., Environmental Impact Analysis Process (formally known as Air Force Instruction 32-7061). The purpose of an EA is to evaluate the significance of any potential environmental effects that may result from implementing the proposed action or alternatives. If the effects are not judged significant according to CEQ criteria, a Finding of No Significant Impact (FONSI) can be issued and the proposed action can proceed. If the EA finds that significant environmental effects may occur with project implementation, an Environmental Impact Statement (EIS) must be prepared. Following project implementation, any environmental effects must be mitigated to significance or insignificance.

As defined in CEQ regulations (40 CFR 1508.27), significance refers to both context and intensity. Context means that the significance of an action must be analyzed in several contexts, such as national, regional, and local. Significance varies with the setting of the action and both short- and long-term effects are relevant. Intensity refers to the severity of the effect. The following should be considered in evaluating intensity:

- Effects may be both beneficial and adverse (a significant effect may exist even if, on balance, the effect is beneficial);
- The degree to which the proposed action affects public health or safety;
- Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas;
- The degree to which the effects on the quality of the human environment are likely to be highly controversial;
- The degree to which the action may establish a precedent for future actions with significant effects;
- Whether the action is related to other actions with individually insignificant, but cumulatively significant effects;

- The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places (NRHP);
- The degree to which the action may adversely affect an endangered or threatened species or habitat that has been determined to be critical under the Endangered Species Act (ESA) of 1973; and
- Whether the action threatens a violation of federal, state, or local law.

If the environmental effects are found to be significant according to the CEQ criteria (and cannot be avoided or mitigated), an EIS must be prepared. The evaluative process outlined above is designed to inform the decision maker about the potential environmental consequences of their actions. As a predecisional tool to provide input on the relative merits of a proposed action (or alternatives), the preparation of an EA or EIS is required prior to taking the action.

2.5 PERMIT REQUIREMENTS

Under the Proposed Action, no permits are required for the transfer of property to the landowner.

Permits and actions required for demolition of the facility, implemented under Alternative A are summarized as below:

Table 2-1
Permits and Actions Required for Demolition of the Matagorda TARS Facility

Utilities	Permit Requirements	Action Required
Electricity	None	Transformers are currently inactive. American Electric Power (AEP) would remove inactive transformers.
Water Well	None	Well must be plugged by a licensed well driller or pump installer. Another option is for the landowner to plug the well. In this case, he will need to contact TDLR of his intent and request a well-plugging form. A copy of this form must be sent to TDLR and the local water conservation district after the well has been plugged.
Septic System	None	Septic system must be pumped out by a septic system pumper.
Phone	None	Service has been disconnected; no further action required.

According to Texas law, a well is considered abandoned if it has not been used for six consecutive months. This is the case of the well located at the Matagorda TARS Site. The landowner is responsible for plugging this well and is liable for any water contamination or injury that might result from the well. Abandoned wells can be fixed by three different methods:

- Return the well to an operable state by making sure the casing, pump, and pump column are in good condition;
- Cap the well to prevent surface water or contaminants from entering the well. The cap should support 400 pounds and should not be easily removable by hand; or
- Plug the well from the bottom to the top with bentonite, bentonite grout, or Portland cement. Large diameter wells can be filled with clay or caliche soil.

The abandoned water well at the Matagorda, Texas TARS Site can only be fixed by the landowner (Braman Ranches LLC), a licensed well driller, or a licensed pump installer. If the landowner intends to plug the abandoned well, he should first notify the Water Well Drillers Program of the Texas Department of Licensing and Regulation (TDLR) of his intent to plug the well and request a state well-plugging form. Within 30 days after the well is plugged, a copy of the form must be sent to the TDLR. In addition, a copy of the form must also be sent to the local groundwater conservation district. However, because the Air Force was the operator of this well, it becomes the Air Force's responsibility (not the landowner's) to correctly plug the well and report to the TWDB prior to cancellation of the lease with the landowner.

Any permits required to be obtained for the demolition of the site shall become the contractual responsibility of the demolition contractor to include any necessary air and/or building permits.

There are no permits required for implementation of Alternative B (No-Action Alternative).

2.6 COMPARISON OF ALTERNATIVES

Table 2-2 provides a summary of the effects of implementing each alternative.

Table 2-2
Comparison of Alternatives

Resource Effects	Proposed Action and Alternatives
Land Use, Visual Resources, and Recreation	• *Proposed Action*: no change from current conditions • *Alternative A*: potential for land use to change following restoration of the site; and visual resources are expected to improve with the demolition and revegetation of the site • *Alternative B (No-Action Alternative)*: no change from current conditions
Socioeconomics and Environmental Justice	• *Proposed Action*: there would be no long-term significant effects; temporary negative effect due to the maintenance and security personnel's loss of jobs • *Alternative A*: temporary increase in the local economy due to available jobs during demolition and restoration activities; there would be no long-term effects • *Alternative B (No-Action Alternative)*: no change from current conditions
Cultural Resources	• *Proposed Action*: no known cultural resources exist on the site, so

Resource Effects	Proposed Action and Alternatives
	none would be affected • *Alternative A*: no known cultural resources exist on the site, so none would be affected • *Alternative B (No-Action Alternative)*: no change from current conditions
Infrastructure	• *Proposed Action*: no change of infrastructure from current conditions; solid waste would be removed from the site • *Alternative A*: there would be no long-term significant effects • *Alternative B (No-Action Alternative)*: no change from current conditions
Physical Resources	• *Proposed Action*: no change from current conditions • *Alternative A*: temporary disturbance to soils during demolition; erosion and sediment controls through silt fences would minimize erosion and offsite sediment delivery to receiving waters • *Alternative B (No-Action Alternative)*: no change from current conditions
Hazardous Materials and Hazardous Waste	• *Proposed Action*: there would be no significant effects; any hazardous materials or waste present at the site would be disposed of under the requirements of CERCLA • *Alternative A*: there would be no significant effects; any hazardous materials or waste present at the site would be disposed of under the requirements of CERCLA; any LBP discovered during demolition activities would be disposed of according to OSHA and RCRA regulations • *Alternative B (No-Action Alternative)*: no change from current conditions
Biological Resources	• *Proposed Action*: no change from current conditions • *Alternative A*: temporary disturbance to vegetation during demolition; potential for temporary effects to wildlife species during demolition, including any threatened or endangered species that might make use of the site; potential for positive effects to wildlife species following restoration; positive effects to vegetation after restoration of the site, when the site resembles its natural state; no effect to wetlands or floodplains since the site does not exist within a floodplain and there are no wetlands at the site, where demolition would occur. • *Alternative B (No-Action Alternative)*: no change from current conditions
Air Quality	• *Proposed Action*: there would be no significant effects; air emissions resulting from maintenance and security personnel transportation to work would be eliminated upon transfer of property. • *Alternative A*: potential for temporary, localized effects to air quality during demolition from vehicle emissions and operation of machinery. However, the amount of the emissions would be negligible. Table 4-1 contains estimated air emission numbers.

Resource Effects	Proposed Action and Alternatives
	• *Alternative B (No-Action Alternative)*: no change from current conditions
Air Space	• *Proposed Action:* There would be an effect to the airspace above the site, since the restricted airspace would no longer be needed. • *Alternative A:* There would be an effect to the airspace above the site, since the restricted airspace would no longer be needed. • *Alternative B (No-Action Alternative):* no change from current conditions

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3.0 EXISTING CONDITIONS

3.1 LAND USE, VISUAL RESOURCES, AND RECREATION

3.1.1 DEFINITION OF THE RESOURCES

The term “land use” refers to real property classifications that indicate either natural conditions or the types of human activity on a parcel. Properties of land can be categorized as residential, commercial, industrial, agricultural, institutional, recreational, etc. Visual resources are defined as the quality of the environment perceived through the visual sense only. Recreation refers to activities performed by humans that result in fun or pleasure. Some examples of recreational activities include fishing, hunting, skiing, etc.

3.1.2 LAND USE

The Matagorda TARS Site is a 1,000 foot square tract of land located within a 2,055-acre tract of land. Surrounding the site is undeveloped openland, containing mesquite, cedar, and elm trees, as well as some various grasses and weeds. In the land north of the site is a small creek within the openland. Prior to construction of the Matagorda TARS Site, the area was used extensively for agriculture, including rice farming and cattle grazing.

3.1.3 VISUAL RESOURCES

The Matagorda TARS Site is composed of approximately 23 acres configured in a 1,000-foot square. The Site includes the following buildings: the Operations Building, Maintenance Garage Building, Payload Service Building, Water Tank and Pump Storage Building, Guard House, and the Hazardous Materials Storage Building. All of these structures are located on the eastern portion of the site. The central portion consists of the concrete circular launching pad and mooring system for the aerostat. Appendix B contains photographs of the Matagorda TARS Site.

3.1.4 RECREATION

The Matagorda TARS Site is in cold storage and employs no personnel. In addition, this site is closed off to the public. No recreational activities are currently present at the site.

3.2 SOCIOECONOMICS, DEMOGRAPHICS, AND ENVIRONMENTAL JUSTICE

3.2.1 DEFINITION OF THE RESOURCES

3.2.2 SOCIOECONOMICS

Socioeconomics is defined as the study of the relationships between economic activity and social life. Economic activity encompasses the economically active population, including persons that furnish the supply of labor for the production of economic goods and services. The production

of economic goods and services includes all production and processing of primary products whether for market, for barter, or for own consumption; the production of all other goods for the market; and in the case of households that produce such goods and services for the market, the corresponding production for their own consumption. Economic activity affects employment, personal income, and industrial or commercial growth. When these areas are affected, other components are often affected, including housing availability and the provision of public services. Socioeconomic data is available at the county, state, and national levels. This data shows trends of socioeconomic conditions present at each level.

3.2.3 DEMOGRAPHICS

Demographics are statistical data that describes the makeup of a given area, and includes information such as age range, gender, education levels, and average household income. Demographic data is important when evaluating a proposed action. The socioeconomic data shown in this chapter is presented at the county and state level. The data was collected from previously published documents issued by federal, state, and local agencies and from state and national databases.

3.2.4 ENVIRONMENTAL JUSTICE

According to the U.S. Environmental Protection Agency Office of Environmental Justice, environmental justice is defined as follows:

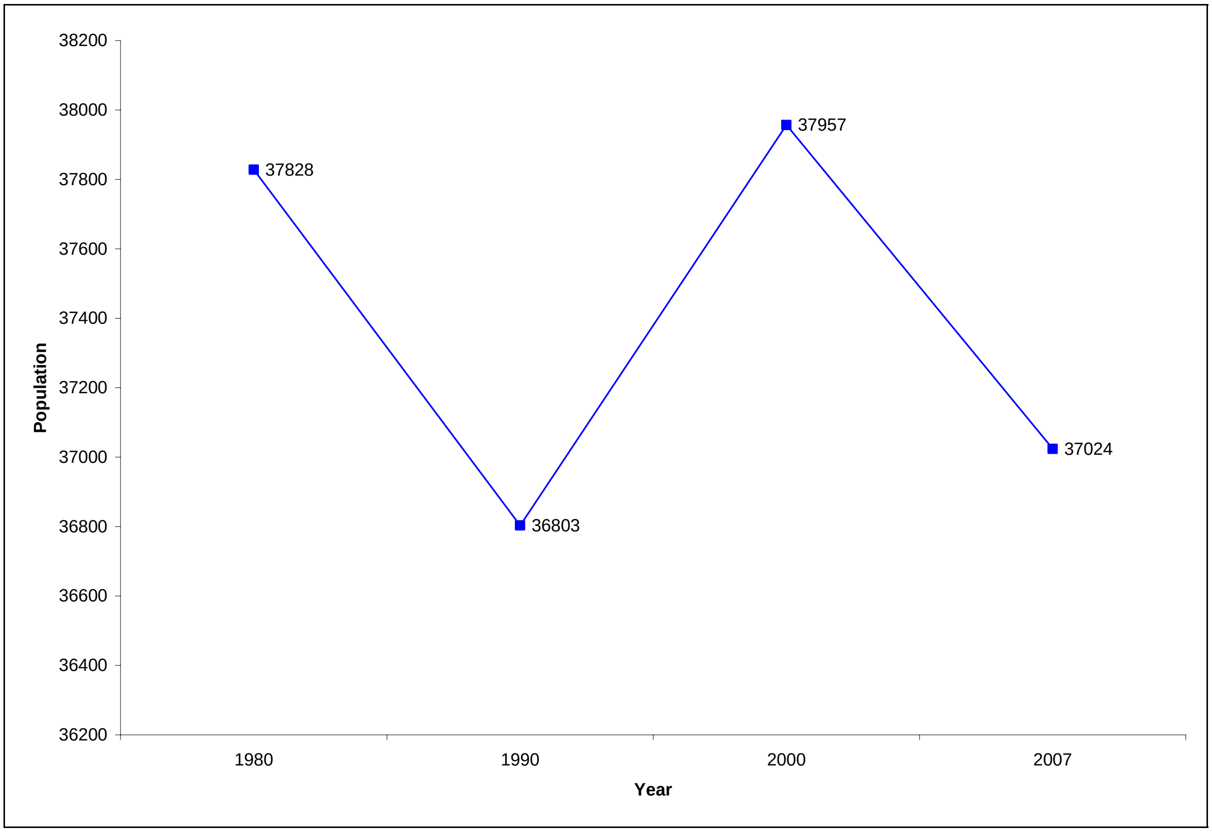
> "Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work."

In 1994, Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued. This EO requires that federal agencies make achieving environmental justice part of their mission. In addition, the U.S. Environmental Protection Agency (EPA) has identified environmental justice as a key priority. EO 12898 was issued to ensure the fair treatment of all individuals, regardless of their race, national origin, or income, with respect to the development and enforcement of environmental laws, regulations, and policies.

3.2.5 EXISTING CONDITIONS OF SOCIOECONOMICS, DEMOGRAPHICS, AND ENVIRONMENTAL JUSTICE RESOURCES

Population. The Matagorda TARS Site is located within Matagorda County and is approximately 1-1/2 miles northeast of the city of Matagorda, Texas. In 2007, Texas had an estimated population of 23,904,380 and Matagorda County had an estimated population of 37,024. It is estimated that Matagorda County experienced a 2.5 percent decrease in its

population since April 2000 (U.S. Census Bureau 2007). Figure 3-1 provides the population trend data for selected years in Matagorda County.



Source: U.S. Census Bureau

Figure 3-1
Population of Matagorda County in Various Years

Employment. The Matagorda TARS Site is deactivated and employs no personnel, except contract grounds maintenance and security personnel. Table 3-1 shows the type of employment by industry for Matagorda County and the state of Texas. A large portion of Texas and Matagorda County residents are employed in the education, health, and social service trade. In 2008, Matagorda County experienced an unemployment rate of 7.0 percent, which drastically increased from the 4.9 percent rate seen in 2000 (U.S. Census Bureau).

Table 3-1
Employment by Industry in Matagorda County and the State of Texas

Employment by Industry	Texas	Matagorda County
Agriculture, Forestry, Fishing, Hunting, and Mining	2.77%	11.72%
Construction	9.20%	11.30%
Manufacturing	10.11%	12.67%
Wholesale Trade	3.63%	1.52%
Retail Trade	11.60%	8.49%

Employment by Industry	Texas	Matagorda County
Transportation, Warehousing, and Utilities	5.67%	10.18%
Information	<0.1%	0.51%
Finance, Insurance, Real Estate, Rental, and Leasing	7.00%	2.74%
Professional, Scientific, Management, Administrative, and Waste Management Services	10.21%	5.09%
Educational, Health Care, Social Services	19.81%	23.00%
Arts, Entertainment, Recreation, Accommodation, and Food Services	8.17%	7.08%
Other Services (Except Public Administration)	5.27%	3.35%
Public Administration	4.22%	2.36%

Source: U.S. Census Bureau, 2005-2007

Environmental Justice. To successfully evaluate environmental justice issues, information on race and poverty characteristics is needed. This information can be found for Matagorda County and the state of Texas in Table 3-2.

Table 3-2
Race and Poverty Characteristics of Matagorda County and the State of Texas

Characteristics	Texas	Matagorda County
Total Population	24,326,974	37,265
% White	47.4%	48.1%
% Black or African American	11.9%	12.2%
% American Indian, Eskimo, or Aleut	0.8%	0.9%
% Asian	3.5%	2.2%
% Native Hawaiian and Other Pacific Islander	0.1%	0.1%
% Hispanic or Latino	36.5%	36.9%
% Other	1.3%	1.1%
% Families Below Poverty	16.3%	22.5%
Median Household Income	$47,563	$38,680

Source: U.S. Census Bureau, 2007-2008

3.3 CULTURAL AND HISTORICAL RESOURCES

3.3.1 DEFINITION OF THE RESOURCES

Cultural resources are typically divided into three major categories: archaeological resources (prehistoric or historic), architectural resources, and traditional cultural properties.

- *Archaeological resources* consist of the physical remains of past human activity. The scientific study of these remains is essential to the understanding and appreciation of prehistoric and historic cultural development. Prehistoric refers to any time or object that predates recorded history, while historic refers to any time or object of the past after written record.

- *Architectural resources* are those standing structures that are usually over 50 years of age and are of significant historic or aesthetic importance to be considered for inclusion in the NRHP.
- *Traditional cultural properties* are properties or places that are eligible for inclusion on the NRHP because of their association with cultural practices or beliefs that are (1) rooted in the history of a community, and (2) are important to maintaining the continuity of that community's traditional beliefs and practices.

3.3.2 CULTURAL AND HISTORICAL SETTING

Paleo-Indian (13,000-7,900 B.C). Archaeological research has shown that there was relatively little occupation of Paleo-Indians in Matagorda County during the Paleo-Indian Period. However, stone, projectile points from the beginning of the period have been discovered, thus suggesting that Paleo-Indians were present in the county (TSHA 2008)

Archaic (8,000 B.C.-1,000 A.D). According to the 2000 Matagorda EBS, "sites are common in most parts of southern Texas, and reported in virtually all topographic localities…Three sites were recorded in Matagorda County…for this period (Moore and Ensor 1990)."
Prehistoric (1,000 -1,400 A.D.). Prehistoric sites are abundant throughout south Texas. The coastal area provided a wide range of fauna that could be used as a food source, such as various marine and brackish water species.

Findings of small arrow points mark the spread of the bow and arrow throughout Texas. Cultural remains from the central Gulf Coast are referred to as the Rockport Complex. The Rockport Complex represents a population that may have been ancestral to the Karankawas of the historic period. These people hunted and fished along bayshores and moved inland to hunt bison. In addition, an asphalt-lined, thin-walled pottery, called the Rockport Ware, is diagnostic of the Rockport Complex (TSHA 2008).

Historic (1,400 A.D.- Present). Before European exploration in the early 1500s, the Karankawa Indians inhabited Matagorda County. By the eighteenth and nineteenth centuries, additional tribes, notably the Tonkawa Indians of central Texas, moved into this area. Alvar Nunez Cabeza de Vaca, who passed through Matagorda County sometime after 1528, conducted the first recorded European expedition into Texas. In 1558, Guido de Lavazares landed at Matagorda Bay and claimed the area for King Charles V. In 1690, Manuel Jose de Cardenas y Magana went through Matagorda Bay as part of the Llanos-Cardenas expedition. In addition, the Alarcon expedition passed through Matagorda County between 1718 and 1719.

The first white residents of Matagorda County were soldiers sent to protect new settlers from the Karankawa Indians. Steven F. Austin issued grants for multiple families in the area. Stephen F. Austin, known as the "Father of Texas," led the colonization of the region by settlers from the United States. In 1827, he received permits to settle approximately 300 additional families in areas of the coast that were previously forbidden by the Mexican government. In 1829, Austin convinced the Mexican government that a military post was needed to protect incoming settlers. This resulted in the founding of the town of Matagorda, which quickly flourished. Following the

Texas Revolution in 1836, Matagorda County was organized as one of the first 23 counties by the Republic of Texas and Matagorda was designated as the county seat.

Between 1850 and 1855, slaveholders from Georgia, South Carolina, and Virginia began bringing slaves into Matagorda County to work on large plantations in the bottomlands of the Colorado River and Caney Creek. The area between Matagorda and Brazoria was referred to as "Old Caney" and was particularly successful in its production of cotton and sugar.

During the presidential election of 1860, the majority of Matagorda County's voters supported John Bell. However, in 1861, the county overwhelmingly supported secession from the union. At this time, several confederate camps, posts, and garrisons were established in the area. During the Civil War, no union troops actually entered into Matagorda County, but the union's blockade of the Texas coast, resulted in the restriction of foreign trade of cotton, the crippling of commerce at the port in Matagorda, and extreme damage to the local economy. Following the Civil War, land values and the county's tax base declined severely.

By 1870, cotton production began to revive, although the economy and population of the county grew slowly until the end of the nineteenth century. From 1875 to 1880, the Matagorda County government was experiencing financial difficulties. During this time, few towns and little commerce existed in the county. In the 1890s, the agricultural economy began to develop rapidly. This is because people from the north-central and central-western states began to move to the area to farm. By 1894, the city of Bay City was established. Because Bay City was located near the center of the county, it replaced Matagorda as county seat.

3.3.3 EXISTING CONDITIONS OF CULTURAL AND HISTORIC RESOURCES

Prior to the construction of the TARS Site, the area consisted of an abandoned rice field, with various weeds and grasses and occasional clumps of mesquite trees. The land was assumed to be primarily used for agricultural purposes and for livestock.

According to the Texas Historical Commission (THC), no cultural or archeological sites exist at the site (Appendix A). No areas of the site are considered of high probability of having prehistoric occupation due to lack of a water source and the clay-like soil present.

3.4 INFRASTRUCTURE

3.4.1 DEFINITION OF THE RESOURCE

Infrastructure is defined as the basic physical and organizational structures needed for the operation of a society or enterprise. Infrastructure also consists of the facilities and services necessary for an economy to function. Infrastructure typically consists of physical structures that support a specific area. For example, roads, water supply, sewers, power grids, and telecommunications are all systems of infrastructure. The infrastructure information provided in this chapter includes an overview of each infrastructure component and a description of its existing condition.

3.4.2 TRANSPORTATION

Methods of transportation at the Matagorda TARS Site consist of a paved road off Highway 60 that serves as an entryway to the site. In addition, concrete is present from the entranceway towards and surrounding the buildings to allow for vehicle transportation. Since the Matagorda TARS Site is closed, transportation does not currently exist at the site except for grounds maintenance vehicles and boundary fence inspection vehicles.

3.4.3 UTILITIES (ELECTRICITY, WATER, SEPTIC SYSTEM, ETC)

Power Supply. Since the TARS Site is in cold storage, there is no power supply available to the site. However, prior to deactivation of the site, electricity services were provided by American Electric Power (AEP). There are three transformers onsite, one located in each of the following buildings: Mechanical Building, Payload Service Building, and Operations Building. AEP would need to be contacted under implementation of Alternative A to remove these transformers and their services from the facility.

Water Supply. A well is located onsite that provides water to the site. However, this well was only used for the site's restrooms, sinks, etc. and was not used for drinking water. The well is 685 feet deep, with a well water pump set at 126 feet. The well runs water at a rate of 60 gallons per minute (gpm). When the site was operational, drinking water was provided. Gallons of Ozarka water were located in various areas within the site. Ozarka is a brand of water that is bottled and sold in the south-central U.S. Under implementation of Alternative A, the water well would be closed in accordance with the State Regulations.

Sewer and Wastewater Systems. The Matagorda TARS Site contains an onsite septic system that consists of a 1,000-gallon dosing tank, a 1,000-gallon effluent tank, and a 3,000-gallon solids tank. This septic system flows into two leach fields, which are located west of the Operations Building, between the building and the concrete launching pad. Under implementation of Alternative A, the septic tank would be closed in accordance with the State Regulations.

Natural Gas. There is no natural gas being provided to the site since it is currently in cold storage. However, gas lines and electrical meters are located at the property. These will need to be removed if Alternative A is implemented.

Communications. Phone and internet services are not available at the site since the site is in cold storage.

Solid Waste Management. Solid waste is not currently being accumulated at the site, since the site is not operational and employs no personnel. The contract personnel that provide ground maintenance and security haul out any waste that they generate while onsite. However, prior to deactivation, Matagorda Solid Waste Collection System was contracted to remove solid waste from the facility.

3.5 PHYSICAL RESOURCES

3.5.1 DEFINITION OF THE RESOURCE

Physical resources include geological and water resources.

Geological Resources. Geological resources consist of materials of the Earth's surface and subsurface. Most commonly, these resources are described in terms of topography and physiography, geology, soils, and where applicable, geologic hazards and paleontology. Topography and physiography refers to the study of the Earth's surface shape and features, as well as the description of these shapes and features. More specifically, topography involves the relief or terrain of an area, the three-dimensional quality of the surface, and the identification of specific landforms. Physiography is the systematic description of nature in general.

Geology is the study of the origin, history, and structure of the earth. In addition, it includes the study of organisms that have inhabited Earth in the past. An important part of geology is the study of how Earth's materials, structures, processes, and organisms have changed over time.

Soils are the unconsolidated mineral or organic materials on the immediate surface of the earth that serve as natural mediums for the growth of land plants. Soil is made up of particles of broken rock that have been chemically and environmentally altered through various processes, such as weathering and erosion. Various factors that affect the formation of soils include parent materials, climate, topography, biological factors, and time. The United States Department of Agriculture (USDA) and the National Cooperative Soil Survey (NCSS) provide an elaborate classification of soil types according to several parameters.

Water Resources. Water resources are sources of water that are useful or potentially useful to humans. For example, groundwater and surface water are water resources.

Groundwater is the water located beneath the surface of the earth, within soil pore spaces and in the fractures of lithologic formations. The water table is the level at which groundwater pressure is equal to atmospheric pressure. This occurs at the depth in which the soil pore spaces or fractures become completely saturated with water. Groundwater is naturally replenished by surface water from precipitation, streams, and rivers. Groundwater is often used for agricultural, municipal, and industrial uses through the construction of wells.
Surface water is any water that has collected on the ground or is in a stream, river, lake, wetland, or ocean. Surface water is also replenished through precipitation and is naturally lost through discharge to evaporation and sub-surface seepage into the groundwater.

Stormwater is a form of surface water that occurs when water originates during precipitation events. Any stormwater that does not soak into the ground becomes surface runoff. Stormwater is of important concern because of flood control and water pollution. When stormwater falls on impervious surfaces (parking lots, roads, buildings, compacted soils, etc) it cannot soak into the ground, thus creating runoff. Runoff can cause many problems, including the erosion of watercourses and flooding. In addition, daily human activities result in the deposition of

pollutants on roads, lawns, roofs, farm fields, etc. Therefore, when stormwater results in runoff, pollutants have the potential to be introduced into the surface water.

The Clean Water Act (CWA) (USC 33 1251 et. seq) establishes the basic structure for regulating discharges of pollutants into the waters of the U.S. by regulating quality standards for surface waters. The CWA makes it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit is obtained. EPA's National Pollutant Discharge Elimination System (NPDES) controls discharges. NPDES regulates the discharge of point (pipe, manufactured ditch, etc) and nonpoint (stormwater) sources of water pollution.

3.5.2 GEOLOGICAL RESOURCES

Topography and Physiography. The Matagorda TARS Site is located within the Gulf Coastal Plains physiographic province. Within this area, the site is located within the Coastal Plains subprovince. Topography in the area consists of nearly flat prairies. The elevation of the site is approximately five feet above sea level, in a flat area west of Highway 60. There is a small drainage swale or channel that extends westward near the northern site boundary. This channel becomes less distinct further west, but appears to drain westward towards the Colorado River. Additional concrete drainage swales have been constructed to channel stormwater from landscaped areas around the concrete launching pad to the northwest corner of the property. Here, stormwater enters the ditch that flows west to the Colorado River.
Geology. The Matagorda TARS Site lies within the West Gulf geomorphic region. In this area, surface formations dip towards the Gulf of Mexico at an angle of less than six degrees. The geologic outcrop of the site is the Beaumont Formation, which is the oldest and major outcrop of Matagorda County. The Beaumont Formation is considered a regressive or prograding geologic unit that was deposited during a late Pleistocene high sea level stand (Soil Survey of Matagorda County, Appendix H).

During the Pleistocene Era, continental glaciers expanded several times, transferring water from ocean basins to land-based glaciers. Streams that drained into the oceans incised and regraded their channels as they flowed towards a lower, more distant seashore. However, when the glaciers began to melt, the sea level rose. At this time, the incised channels became flooded or alluviated. Subsequently, broad alluvial plains were built along the gulf coast. A paleo-Colorado River laid down the majority of the Beaumont Formation as an alluvial plain. Local relief on the surface of the Beaumont Formation is less than ten feet (Soil Survey of Matagorda County, Appendix H).

Soils. Matagorda County is composed of nine soil associations, including the following: (1) Laewest-Dacosta, (2) Edna-Texana-Telferner, (3) Livico-Dacosta, (4) Pledger-Asa, (5) Brazoria-Norwood-Clemville, (6) Livia-Palacios-Francitas, (7) Harris-Velasco-Placedo, (8) Surfside, and (9) Galveston-Follet Associations. The first three soil associations listed above are typical at the Matagorda TARS Site. Dominant soils in this area are Dacosta, Edna, Laewest, Livico, Telferner, and Texana soils. These soils are formed in the clayey and loamy sediments of the Beaumont Formation and are nearly level to gently sloping. These soils are typically fertile and well suited to crops and grasses. The Dacosta and Laewest soils are well suited to corn, cotton, grain sorghum, and rice. The Edna, Telferner, and Texana soils are best suited to irrigated rice,

coastal Bermuda grass, and other grasses for pasture or hayland. Livico soils are extremely high in sodium and are therefore best suited to pasture and rangeland.

3.5.3 WATER RESOURCES

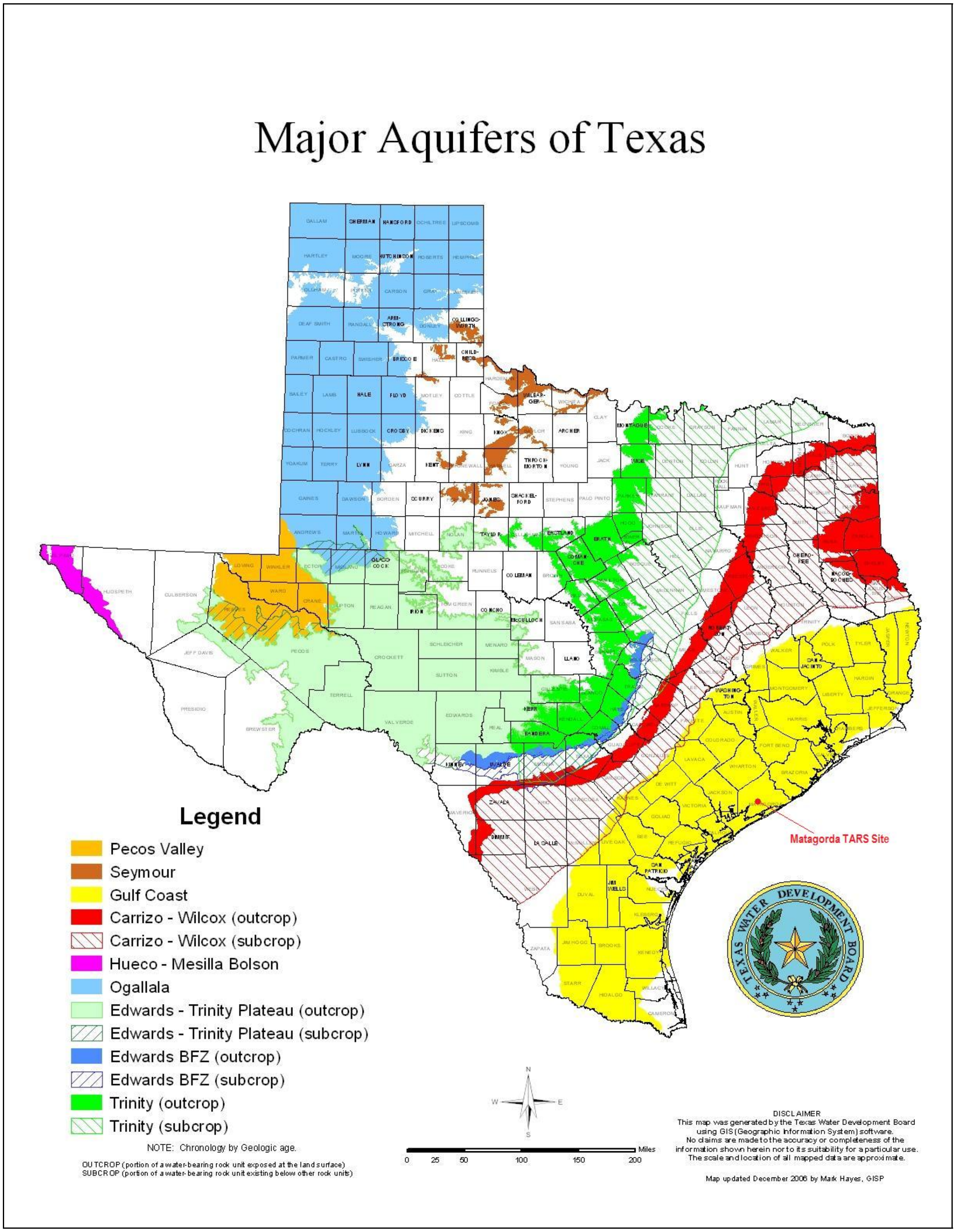
Groundwater. The principal water-yielding aquifer at the Matagorda TARS Site is the Gulf Coast Aquifer (Figure 3-2). The Gulf Coast Aquifer extends along the Gulf of Mexico from Florida to Mexico. In Texas, this aquifer provides water to all or parts of 54 various counties that extend from the Rio Grande northwest to the Louisiana-Texas border. Approximately 90 percent of the total pumpage from this aquifer results from municipal and irrigation uses. Within the shallower portions of the aquifer (including the area of the TARS Site), water quality is generally good. According to the Texas Water Development Board (TWDB 2009), it is common for groundwater in this area to contain less than 500 milligrams per liter of dissolved solids, up to a depth of 3,200 feet (Appendix H).

The Gulf Coast Aquifer contains interbedded clays, silts, sands, and gravels that form a large, leaky, artesian aquifer system. This system is composed of the following four components (TWDB 2009):

1. *Catahoula Aquifer* is the deepest layer of the system and it contains groundwater near the outcrop in relatively sand-resistant layers,
2. *Jasper Aquifer* is above the Catahoula aquifer and is primarily composed of Oakville Sandstone,
3. *Evangeline Aquifer* overlies the Jasper aquifer and primarily contains Fleming and Goliad sands, and
4. *Chicot Aquifer* is the uppermost layer of the system, which consists of the Beaumont Formation and overlying alluvial deposits.

The Matagorda TARS Site contains an on-site well with a depth of 685 feet. This well is located in the northeastern corner of the site and produces water at a rate of 60 gpm. This well draws from the Evangeline and Chicot Aquifers. Water from the well is pumped with a pump set at 126 feet into the 20,000-gallon water tank located on the site. This well is not registered with the TWDB. The well is considered abandoned since it has not been in use for six consecutive months. It is the responsibility of the landowner to report to TWDB that this well is abandoned and have it plugged by a licensed well driller or pump installer. However, because the Air Force was the operator of this well, it becomes the Air Force's responsibility to correctly plug the well and report to the TWDB prior to cancellation of the lease with the landowner.

Surface Water. The TARS Site is located within the Brazos-Colorado River Basin (Figure 3-3). Figure 3-4 shows surface water resources near the vicinity of the site. Within a 10-mile radius of the site are the Colorado River, Gulf Intracoastal Waterway, Matagorda Bay, and East Matagorda Bay. The Colorado River is the 18th longest river in the U.S. (862 miles), with both its source and mouth within Texas.



Source: Texas Water Development Board, 2009

Figure 3-2
Gulf Coast Aquifer at the Matagorda TARS Site

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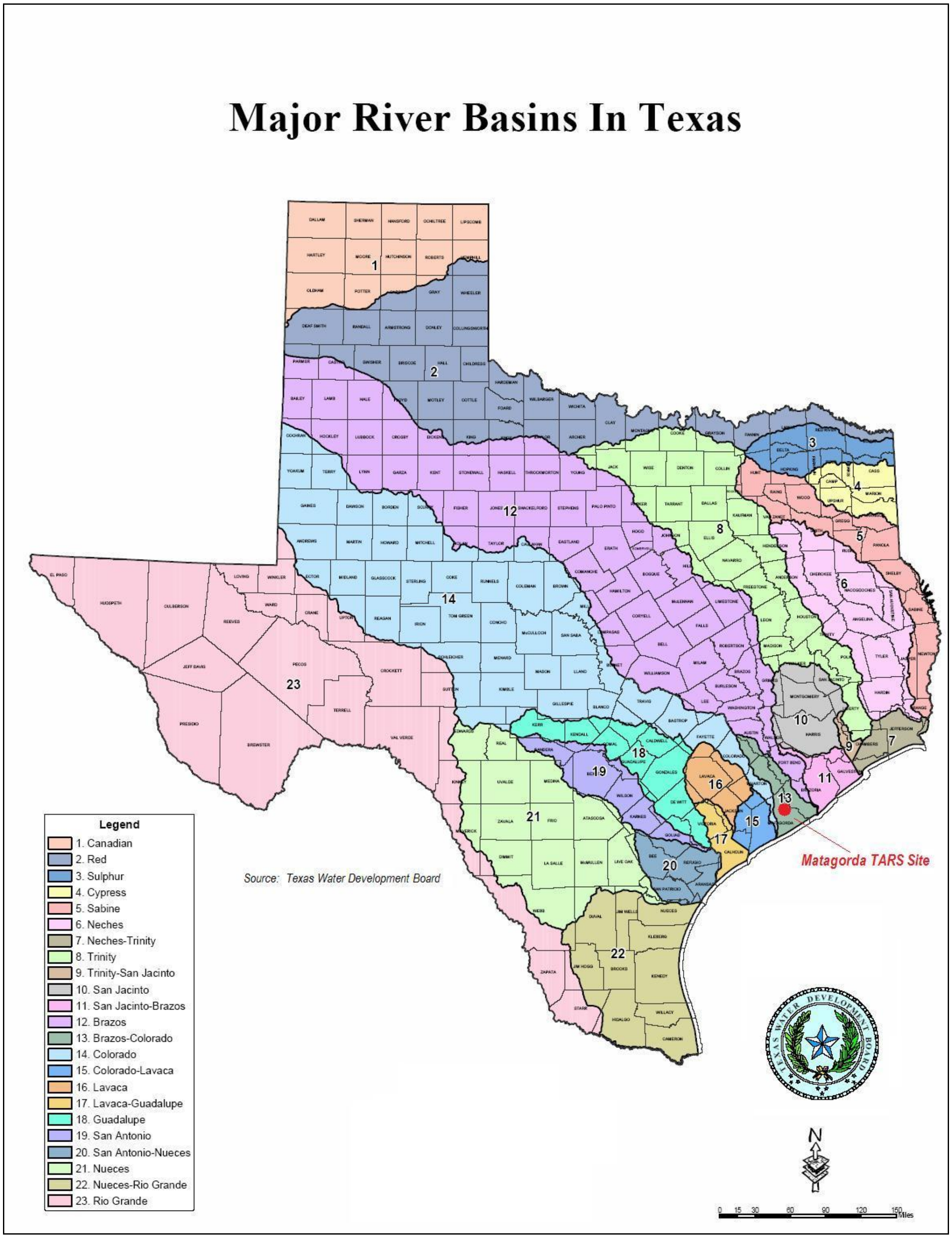

Source: Texas Water Development Board

Figure 3-3
Brazos-Colorado River Basin at the Matagorda TARS Site

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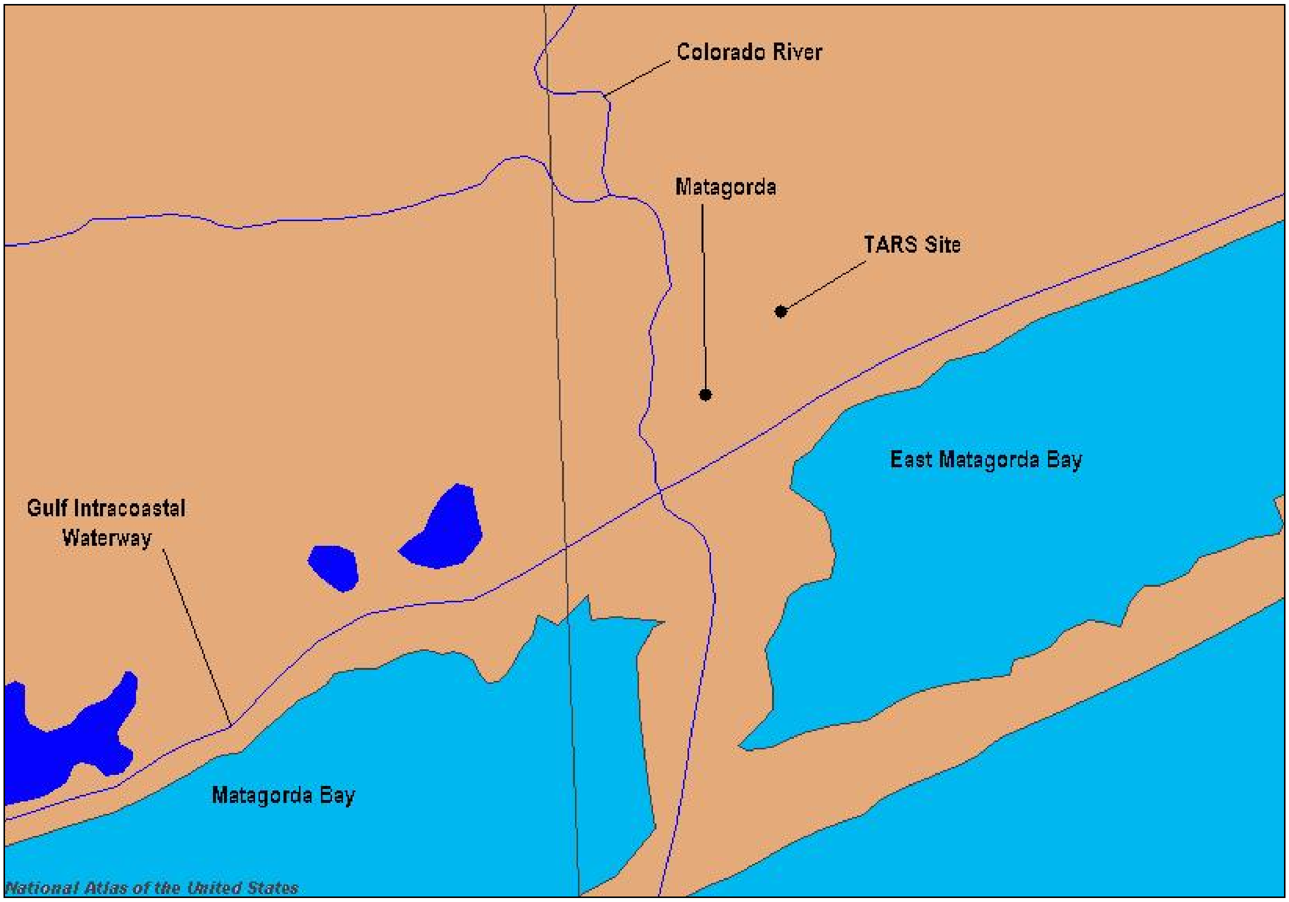

Source: National Atlas

Figure 3-4
Water Bodies near the Matagorda TARS Site

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The Gulf Intracoastal Waterway is a navigable, manmade inland waterway running 1,050 miles from Florida to Texas. This waterway includes a channel with a controlling depth of 12 feet and was originally designed primarily for barge transportation.

Matagorda Bay is a large estuary bay in Texas, located between Calhoun and Matagorda County. On the way to the Gulf of Mexico, the Colorado River empties into this bay. The Matagorda Peninsula separates Matagorda Bay from the Gulf of Mexico. The bay is approximately 352 square miles in area. East Matagorda Bay is located solely in Matagorda County and is enclosed by the Matagorda Peninsula and the tidal flats at the mouth of the Colorado River.

3.6 HAZARDOUS MATERIALS AND WASTE MANAGEMENT

3.6.1 DEFINITION OF THE RESOURCE

Hazardous material is any item or agent (chemical, biological, or physical) that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. OSHA defines a hazardous material as any substance or chemical that is a "health hazard" or "physical hazard", including chemicals that are carcinogenic; toxic agents; irritants; corrosives; sensitizers; agents that act on the hematopoietic system; agents that damage the lungs, skin, eyes, or mucous membranes; chemicals that are combustible, explosive, flammable, oxidizers, pyrophones, unstable-reactive or water-reactive; and chemicals that in the course of normal handling, use, or storage may produce or release dusts, gases, fumes, vapors, mists, or smoke that may have any of the previously mentioned characteristics. The EPA incorporates OSHA's definition but adds any item or chemical that can cause harm to people, plants, or animals when released by spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment.

Hazardous waste is defined by the Resource Conservation and Recovery Act (RCRA) as a waste that has the potential to (1) cause, or significantly contribute, to an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness; or (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed. The RCRA is a hazardous waste regulation that was enacted in 1976. This act created a system that records hazardous materials and waste. All hazardous wastes must be tracked from the time they are generated until their final disposal. In addition, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) provides regulation for hazardous waste because it creates a Superfund and provides for the clean up and remediation of closed and abandoned hazardous waste sites.

Evaluation of hazardous materials and waste particularly focuses on underground storage tanks (USTs), aboveground storage tanks (ASTs), and the storage, transportation, handling, and use of pesticides and herbicides, fuels, and petroleum, oil, and lubrication (POL) products. In addition, if any hazardous waste was generated, stored, transported, or disposed of at or near the project site, evaluation would be needed.

Additional materials that may pose a risk to human health are asbestos-containing material (ACM) and lead-based paint (LBP). For ACMs, the EPA has proposed a concentration

limitation of seven million fibers per liter of drinking water for long fibers (length greater or equal to five micrometers). In addition, OSHA has set limits of 100,000 fibers with lengths greater than or equal to 5 micrometers per cubic meter of workplace air for 8-hour shifts and 40-hour workweeks. In 1978, the U.S. Consumer Product Safety Commission (16 Code of Federal Regulation CFR 1303) banned the residential use of LBP in the United States. The U.S Government defines LBP as “any paint, surface coating that contains lead equal to or exceeding one milligram per square centimeter or 0.5 percent by weight.”

In 1975, the DoD established the Environmental Restoration Program (ERP) to provide guidelines and funding for the investigation and remediation of hazardous waste sites caused by disposal activities at military installations. The ERP complies with CERCLA, the Superfund Amendments and Reauthorization Act (SARA), and the RCRA. The ERP investigates and, if necessary, cleans up former disposal and test areas. In addition, Air Force Policy Directive (AFPD) 32-70 and AFI 32-700 incorporate the requirements of all federal regulations, other AFIs, and DoD directives for the management of hazardous materials, hazardous waste, and additional dangerous substances.

3.6.2 HAZARDOUS MATERIALS

Hazardous Materials. AFI 32-7086, *Hazardous Materials Management*, manages the procurement and use of hazardous materials to (1) support Air Force missions, (2) protect the safety and health of persons on Air Force installations and communities surrounding Air Force installations by ensuring proper management of hazardous materials, (3) minimize Air Force use of hazardous materials consistent with mission requirements, and (4) maintain Air Force compliance with environmental requirements for hazardous materials usage. In addition, 10 U.S.C. § 2692, *Storage, Treatment, and Disposal of Nondefense Toxic and Hazardous Materials*, does not allow the DoD to store, treat, or dispose of any material that is toxic or hazardous material that is not owned either by the DoD or by a member of the armed forces assigned to or provided military housing on the installation.

During inspection of the TARS Site, no evidence of the improper use, storage, or disposal of hazardous material was observed. The site currently stores air tool oil, engine coolant, car wash solution, and insecticides in a storage cabinet within the Maintenance Garage Building, Building T-13 (Appendix B, page B-11). In addition, basic cleaning supplies are stored for maintenance of the site in the Operations Building (Appendix B, page B-25, photograph #48). Prior to deactivation of the site, various products containing hazardous materials were stored, including antifreeze, paints/coatings, solvents, sealants, and POL products. The products were stored in various locations throughout the site, such as in the Logistics Room and Electrical Repair Room within the Operations Building, the Maintenance Garage Building, and the Payload Services Building. Appendix C contains a list of all hazardous substances stored onsite in the past. Material Safety Data Sheets (MSDS) are kept for all of these substances and could be found within the Operations Building.

At the Matagorda TARS Site, diesel fuel was stored in a 5,700-gallon AST (Appendix B, pages B-2 to B-4). This AST consists of a secondary steel containment structure with a containment capacity of 7,100 gallons. Within the spills containment structure, a slope ramp is present that

was used as an entranceway for vehicles into the containment area during refueling operations. However, now that the site is in cold storage, this tank has been drained completely.
Asbestos-Containing Material (ACM). Based on interviews and review of available documents, no asbestos surveys have been conducted for the TARS Site. However, the EPA began banning the manufacture of ACMs in the late 1970s. Therefore, the Matagorda TARS Site should not contain any ACMs since the facility was built in 1992.

Polychlorinated Biphenyls (PCBs). Electric transformers and ballasts within older fluorescent light fixtures can contain PCBs. There are three transformers present at the Matagorda TARS Site but these transformers contain less than one parts per million (ppm) of PCBs (Appendix B, pages B-4 and B-5). The EPA banned the manufacture of PCBs in 1978. Since the TARS Site was built in 1992, no PCBs will be present within the ballasts of the fluorescent light fixtures.

Lead-Based Paint (LBP). Yellow LBP was previously used on the concrete launching pad and access ways to the site. This paint was also used on various traffic control devices, such as bollards and stripings, and was used on other concrete items, such as the septic tank coverlids. Since the usage of this LBP, the Matagorda TARS Site has converted to traffic paint that does not contain lead. However, it is common for these areas to be repainted without removing the previous layer of paint. Therefore, there is a possibility that lead from the previously used LBP is still present in these areas.

Another alternative to disposing of the LBP as a hazardous waste (if the lead content exceeds five mg/L) is to crush and recycle the concrete that contains the LBP. The U.S. Army Corps of Engineers Research and Development Center completed a report on this process (Appendix D). This alternative is less costly and conserves landfill space. Under implementation of Alternative A, recycling the concrete at the site would be a viable option.

Radon. Radon is a naturally occurring radioactive gas that develops in soils and rocks as uranium decays. Radon is a noble, colorless, and odorless gas that has been determined to increase the risk of developing lung cancer. The EPA assigns zones to every county within the U.S. based on radon potential. Each zone designation reflects the average short-term measurements that can be expected to be measured in a building without the implementation of radon control methods. Figure 3-5 shows the radon zones for Matagorda County. The Matagorda TARS Site is located in Zone 3, which includes areas with a low potential for the presence of radon. Advisory levels for radon in indoor air are four picocuries per liter (PCi/L). Results for radon testing in Matagorda County reveal an average radon level of 0.7 PCi/L. This information can be found in the Environmental Data Resources (EDR) report in Appendix E, page E-72.

Spills. There have been three spills of petroleum products at the Matagorda TARS Site (Table 3-3).

In 1994, diesel fuel spilled during a fuel transfer from a fuel delivery truck to a portable 300-gallon diesel AST (this AST is no longer at the site). Soil that was contaminated was removed from an area of approximately two feet long by four inches wide by two inches deep. The contaminated soil was stored in a 55-gallon drum until properly disposed. Loral Aerospace

Services filed a Pollution Incident Report for this spill, which states that all contaminated soils were immediately removed to avoid further contamination. In addition, the report stated that there was no threat to human life, property, plants, or animals from the spill.

In May 1994, hydraulic fluid spilled onto the mooring system pad. However, this spill was contained within the pad and never made contact with the soil. The spill was cleaned up with absorbents and no Pollution Incident Report was required.

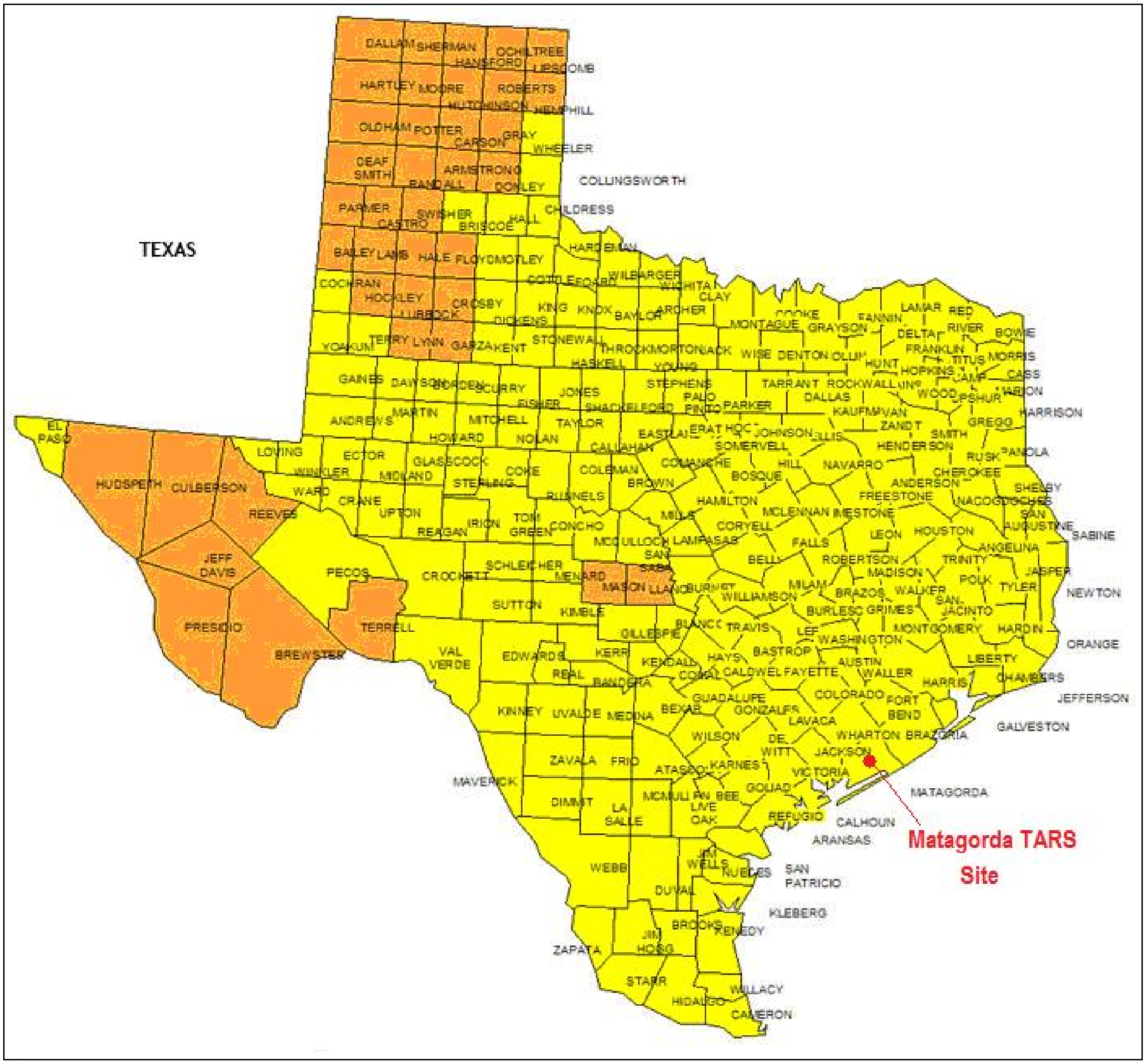
On July 23, 1999, hydraulic fluid spilled in the machinery enclosure within the mooring system due to a faulty hydraulic hose. Approximately two gallons of the fluid spilled and was then immediately collected using oil absorbent material. All contaminated absorbent material was placed in a drum and stored in the Hazardous Materials Storage Building until further disposal. A Pollution Incident Report was filed by Loral Aerospace Services and can be found in Appendix F.

The three spills that took place within the Matagorda TARS Site were less than three gallons in capacity, which does not meet the threshold of the requirement to report the spill to the Texas Commission on Environmental Quality (TCEQ).

Table 3-3
Hazardous Materials Spills at the Matagorda TARS Site

Date of Spill	Location	Material Spilled	Spill Quantity	Corrective Action Taken
April 29, 1994	Portable AST Pad	Diesel Fuel	Approximately 1 gallon	Diesel fuel was cleaned up with absorbents and contaminated soil was removed. Contaminated soil and absorbents were placed in a 55-gallon drum until removed from the site.
May 1994	Mooring System Pad	Hydraulic Fluid	3 gallons	Contained on concrete and cleaned up.
July 23, 1999	Mooring System—Machinery Enclosure	Hydraulic Fluid	2 gallons	The spill was contained within the Machinery Enclosure. The fluid was cleaned up with absorbent material. This material was disposed of properly.

Source: USAF; Final EBS for Matagorda, TX TARS Site and Pollution Incident Report (1999) filed by Loral Aerospace Services.



Zone 1 Highest Potential (greater than 4 pCi/L)

Zone 2 Moderate Potential (from 2 to 4 pCi/L)

Zone 3 Low Potential (less than 2 pCi/L)

Source: U.S. Environmental Protection Agency

Figure 3-5
EPA Radon Zones of Texas

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3.6.3 WASTE MANAGEMENT

Since the Matagorda TARS Site is currently deactivated and in cold storage, no waste oil is being produced that needs to be disposed. Prior to deactivation, waste materials were stored in drums that were located at various locations throughout the site. Two six-gallon drums are still present onsite but are currently empty (Appendix B, page B-17).

3.7 BIOLOGICAL RESOURCES

3.7.1 DEFINITION OF THE RESOURCE

Biological resources include plants, animals, and the habitats in which they live, such as wetlands, forests, and grasslands. Certain plant and animal species are protected or considered sensitive species because they are experiencing a generalized or localized population decline. A protected or sensitive species can be classified as a federally or state threatened or endangered species, a candidate species for federal listing, a species of special concern (SSC), or a species that is managed under a particular management plan. Under the Endangered Species Act (ESA), critical habitat is defined when specific areas within a geographic area are occupied by a federally listed species on which physical and biological features are essential to the conservation of that species.

An endangered species is an organism that is at risk of becoming extinct because it is few in numbers or is threatened by changing environmental or predation parameters. A threatened species is a species that is vulnerable to extinction in the near future. A candidate species is a species being considered for listing under the ESA as an endangered or threatened species but is not yet the subject of a proposed rule. A species of special concern is a species, subspecies, or distinct population that is not federally or state listed but is (a) declining at a rate that could result in listing, or (b) historically occurred in low numbers and is known to have threats pertinent to its persistence.

All migratory birds are protected under the Migratory Bird Treaty Act (MBTA). The MBTA was implemented in 1918 as a result of a convention between Great Britain and the U.S. (USFWS 2008). Since then, Mexico, Japan, and Russia have been included. The original purpose was to protect and regulate migratory bird populations from over harvesting. The importance of this was originally recognized due to the diminishing populations of waterfowl and birds whose feathers were used on hats. The MBTA prohibits the pursuit, hunt, take, kill, capture, possession, sale, or transport of any migratory bird, bird part, nest, or egg except as specifically permitted under the act (16 USC 703-713). In 2007, the U.S. Congress passed a revision providing an avenue for the Armed Forces to apply for take permits. A take permit can be issued for the “incidental take of migratory birds during military readiness activities.” The proponent of a permit must confer and cooperate with the U.S. Fish and Wildlife Service (USFWS) “to develop appropriate and reasonable conservation measures to minimize or mitigate identifiable significant adverse effects” (Department of Interior; Federal Regulation. 72:39, 28 Feb. 2007). “Military readiness does not include (a) the routine operation of installations operating support functions, such as: administrative offices; military exchanges; commissaries; water treatment facilities; storage facilities; schools; housing; motor pools; laundries; morale,

welfare, and recreation activities; shops; and mess halls, (b) the operation of industrial activities, or (c) the construction or demolition of facilities listed above."

A wetland is an area of land whose soil is saturated with moisture either permanently or seasonally. These areas can be covered partially or completely by shallow pools of water. Wetlands include swamps, marshes, bogs, etc. Wetlands are extremely biologically diverse and can support a wide variety of plant and animal life. Wetlands are beneficial in that they improve water quality, store floodwater, provide fish and wildlife habitat, are aesthetically pleasing, and are biologically productive. Section 404 of the CWA establishes a program to regulate the discharge of dredged or fill waters of the U.S., including wetlands. Activities in waters of the U.S. regulated under this program include fill for development, water resource projects, infrastructure development, and mini projects. Section 404 requires a permit before dredged or fill material may be discharged into water of the U.S.

3.7.2 TERRESTRIAL COMMUNITIES AND WILDLIFE

Terrestrial Communities. The Matagorda TARS Site is located within the West Gulf Coastal Grasslands Ecoregion. This region is characteristic of tall vegetation (> 1 meter) that grows on top of reddish soils. The most common species include Texas fluffgrass (*Tridens texanus*), shortleaf crabgrass (*Trichachne hitchcockii*), purple threeawn (*Aristida roemeriana*), slim tridens (*Tridens muticus*), and purple grama (*Bouteloua radicosa*). Climax grasses of this ecoregion include tall bunch grasses such as seacoast bluestem (*Andropogon scoparuium* var. *littoralis*), eastern gamagrass (*Tripsacum dactyloides*), gulf muhly (*Mulenbergia capiallris* var. *filipes*), and several species of panicum (WWF 2001).

Towards the gulf coast, the topography shifts to lower elevations and soils become more saline. In these areas, the prairie becomes more intermixed with gulf cordgrass (*Spartina spartinae*), sedges (*Carex* spp., *Cyperus* spp.), rush (*Junicus* spp.), bulrush (*Scirpus* spp.), and saltgrass (*Distichlis spicata*). Occasionally, tree species will be seen in these areas, such as mesquite (*Prosposis glandulosa*), huisache (*Acacia farnesiana*), lime prickly ash (*Zanthoxylum fagara*), and Texas persimmon (*Diospyros texana*) (WWF 2001).

Wildlife. Common mammals species found in Matagorda County are the white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), hog-nosed skunk (*Conepatus leuconotus*), Virginia opossum (*Didelphis virginiana*), nine-banded armadillo (*Dasypus novemcinctus*), and coyote (*Canis latrans*). Common bird species include the bobwhite quail (*Colinus virginianus*), mourning dove (*Zenaida macroura*), redwing blackbird (*Agelarus phoeniceus*), eastern kingbird (*Tyrannus tyrannus*), eastern meadowlark (*Sturnella magna*), horned lark (*Eremophila alpestris*), and Audubon's oriole (*Icterus graduacauda*). Common reptile species include the broad-banded copperhead (*Agkistrodon contortrix*), ornate box turtle (*Terrapene ornata*), and western diamondback rattlesnake (*Crotalus atrox*) (NRCS 2009).

3.7.3 WETLANDS AND FLOODPLAINS

Wetlands. According to EO 11990, *Protection of Wetlands*, wetlands are defined as:

> "Those areas that are inundate by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river outflows, mudflats, and natural ponds."

The primary requirement of this EO is that federal agencies avoid construction and management practices in areas that would adversely affect wetlands. The exception to this is when there is no practicable alternative and the proposed action includes all practicable measures to minimize harm to the wetlands. EO 11990 also directs federal agencies to minimize the destruction, loss, and degradation of wetlands and to preserve and enhance the natural beneficial values of wetlands in the agency's responsibilities for (a) acquiring, managing, and disposing of federal lands and facilities; (b) providing federally undertaken, finance, or assisted construction and improvements; and (c) conducting federal activities and programs affecting land use, including but not limited to, related land resources planning, regulation, and licensing activities.

The USFWS maintains a National Wetlands Inventory (NWI) that provides information on the characteristics, extent, and status of the nation's wetlands and deepwater habitats. According to this data, there are four wetlands found in the near vicinity of the Matagorda TARS Site (Figure 3-6). These four wetlands are classified as follows: (1) PEMf, (2) PFO1A, (3) PUBFx, and (4) PEM1C.

The PEMf wetland is a Palustrine [P], Emergent [EM], farmed [f] wetland. Trees, shrubs, emergents, mosses, and lichens dominate this nontidal wetland. Vegetation is erect, rooted, herbaceous hydrophytes, with the exception of the mosses and lichens. This vegetation is present for most of the growing season. The soil in this wetland has been altered for the production of crops, but hydrophytes will become reestablished if farming stops.

The PFO1A wetland is a Palustrine [P], Forested [FO], Broad-Leaved [1], Temporarily Flooded [A] wetland. In addition, trees, shrubs, emergents, mosses, and lichens dominate this nontidal wetland. However, unlike the PEMf wetland, this wetland consists of woody vegetation that is six meters or taller. This vegetation is characteristically woody angiosperms that have relatively wide, flat leaves that are shed during the cold season. This wetland is known to have surface water present for at least brief periods during the growing season.

The PUBFx wetland is a Palustrine [P], Unconsolidated Bottom [UB], Semi-permanently Flooded [F], Excavated [x] wetland. Similar to the above two wetlands, this is also a nontidal wetland dominated by trees, shrubs, emergents, mosses, and lichens. This wetland includes at least 25 percent cover of particles smaller than stones and a 30 percent cover of vegetation. Surface water will be present during the growing season. In addition, this wetland lies within a basin or channel that was excavated by man.

The PEM1C wetland is a Palustrine [P], Emergent [EM], Persistent [1], Seasonally Flooded [C] wetland. Trees, shrubs, emergents, mosses, and lichens dominate this nontidal wetland. Vegetation is erect, rooted, herbaceous hydrophytes, with the exception of mosses and lichens.

The vegetation is dominated by species that remain standing until the beginning of the growing season. This wetland will have surface water present for extended periods, especially early during the growing season. However, the surface water is usually gone by the end of the growing season.

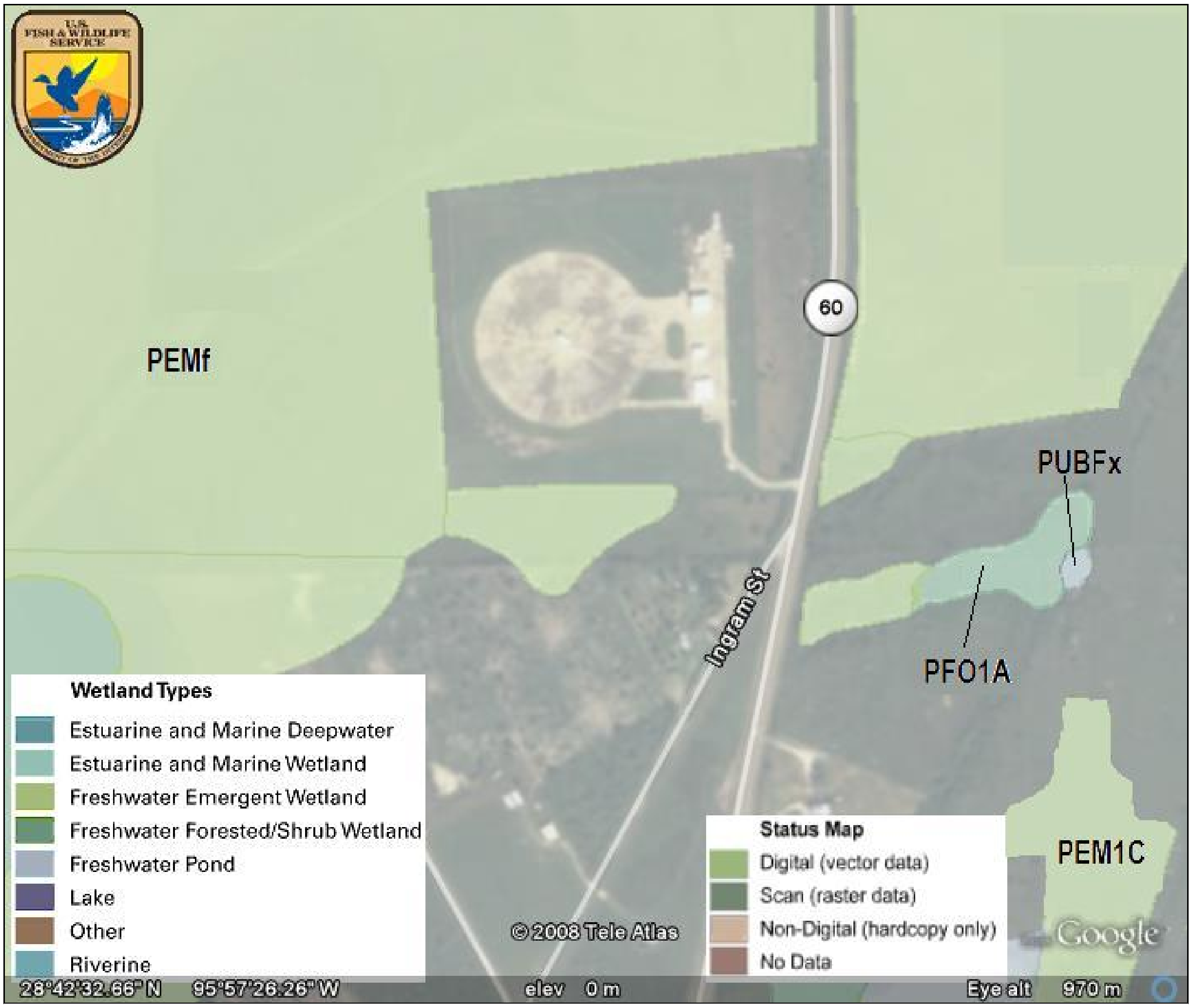
Floodplains. According to EO 11988, *Floodplain Management*, a floodplain is defined as:

> "the lowland and relatively flat areas adjoining inland and coastal waters including flood prone areas of offshore islands, including a minimum, that area subject to a one percent or greater chance of flooding in any given year."

EO 11988 requires federal agencies to avoid the long and short-term adverse effects associated with the occupancy and modification of floodplains. In addition, this EO requires agencies to avoid direct and indirect support of floodplain development whenever there is a practicable alternative. According to the Federal Emergency Management Agency (FEMA), the TARS Site is not located within a floodplain, but is located within Zone C (Figure 3-7). Zone C exists to include areas of minimal flood hazard, usually above the 500-year flood level of the primary source of flooding. Areas categorized as a Zone C may have shallow flooding problems and may have flooding that does not meet the criteria to be mapped as a special flood hazard area, especially ponding and local drainage problems. The FEMA categorizes all areas as either a Zone A (special flood hazard area), Zone B (between base and 500-year floodplain) or a Zone C.

3.7.4 THREATENED AND ENDANGERED AND SPECIAL STATUS SPECIES

Table 3-4 provides a summary of federally and state threatened and endangered species that are known to be present or could potentially be present in Matagorda County. This table includes 27 species, 15 of which are protected under the ESA. However, of these 15 species, 7 (smalltooth sawfish, West Indian manatee, and the Atlantic hawksbill, green, Kemp's Ridley, leatherback, and loggerhead sea turtles) are aquatic and have no potential of occurring on the Matagorda TARS Site. This leaves eight species (brown pelican, Eskimo curlew, Louisiana black bear, northern aplomado falcon, ocelot, piping plover, red wolf, whooping crane) that could be potentially present at the site. The remaining 12 species listed in the table receive state level protection. Appendix G provides a complete list of all threatened, endangered, and special status species.



KEY

PEMf: Palustrine, Emergent, Farmed wetland
PF01A: Palustrine, Forested, Broad-Leaved, Temporarily Flooded wetland
PUBFx: Palustrine, Unconsolidated Bottome, Semi-Permanently Flooded, Excavated wetland
PEM1C: Palustrine, Emergent, Persistent, Seasonally Flooded wetland

Source: Google Earth

Figure 3-6
Wetlands within the Vicinity of the Matagorda TARS Site

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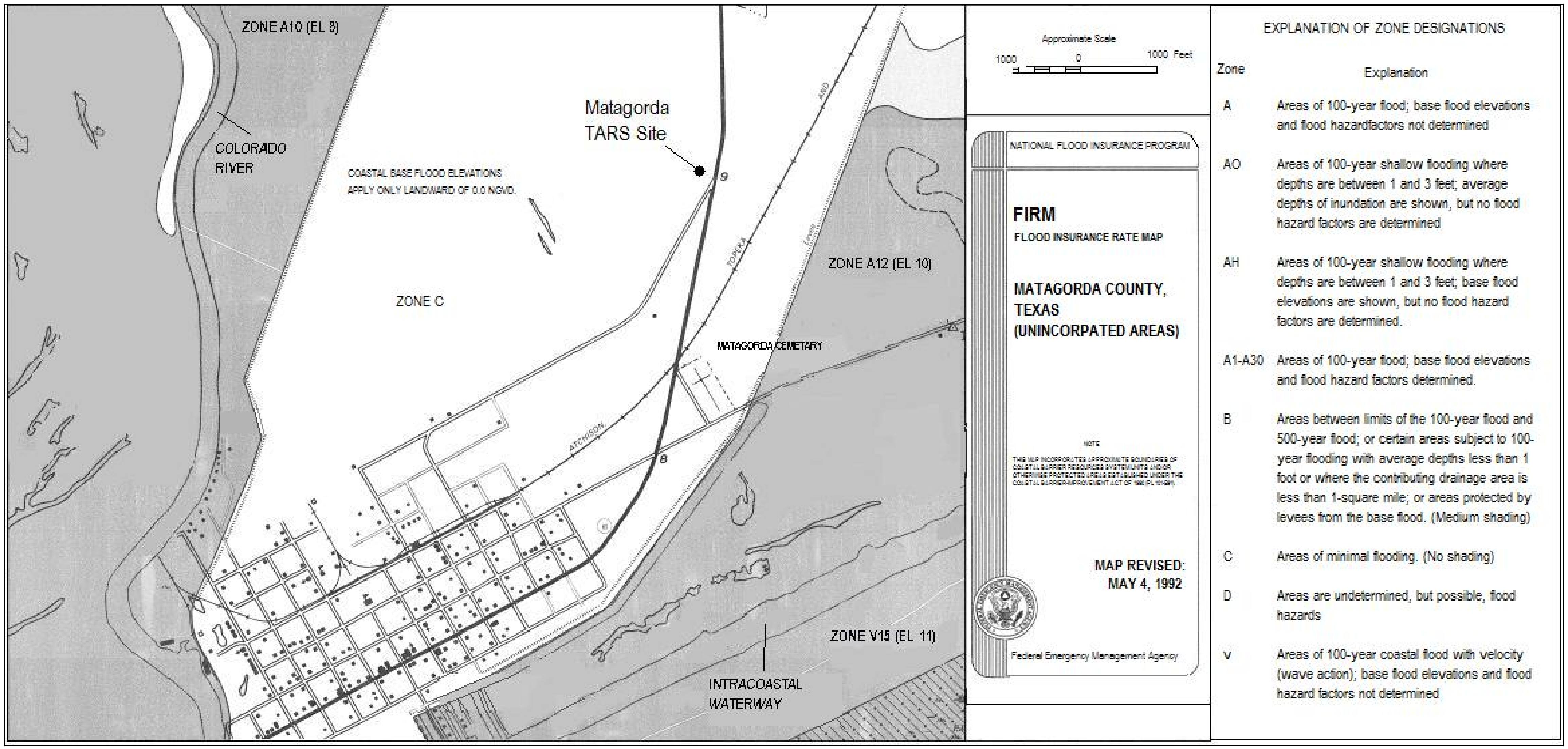

Source: Federal Emergency Management Agency

Figure 3-7
Floodplain Map of the Matagorda TARS Site

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Table 3-4
Threatened and Endangered Species of Matagorda County, Texas

Common Name	Scientific Name	Federal	State
BIRDS			
American Peregrine Falcon	*Falco peregrinus anatum*	-	T
Bald Eagle	*Haliaeetus leucocephalus*	-	T
Brown Pelican	*Pelecanus occidentalis*	E	E
Eskimo Curlew	*Numenius borealis*	E	E
Northern Aplomado Falcon	*Falco femoralis septentrionalis*	E	E
Piping Plover	*Charadrius melodus*	T	T
Reddish Egret	*Egretta rufescens*	-	T
Sooty Tern	*Sterna fuscata*	-	T
White-Faced Ibis	*Plegadis chihi*	-	T
White-Tailed Hawk	*Buteo albicaudatus*	-	T
Whooping Crane	*Grus americana*	E	E
Wood Stork	*Mycteria americana*	-	T
FISHES			
Smalltooth Sawfish	*Pristis pectinata*	E	E
MAMMALS			
Louisiana Black Bear	*Ursus americanus luteolus*	T	T
Ocelot	*Leopardus pardalis*	E	E
Red Wolf	*Canis rufus*	E	E
West Indian Manatee	*Trichechus manatus*	E	E
REPTILES			
Atlantic Hawksbill Sea Turtle	*Eretmochelys imbricate*	E	E
Green Sea Turtle	*Chelonia mydas*	T	T
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	E	E
Leatherback Sea Turtle	*Dermochelys coriacea*	E	E
Loggerhead Sea Turtle	*Caretta caretta*	T	T
Smooth Green Snake	*Liochlorophis vernalis*	-	T
Texas Horned Lizard	*Phrynosoma cornutum*	-	T
Texas Scarlet Snake	*Cernophora coccinea lineri*	-	T
Texas Tortoise	*Gopherus berlandieri*	-	T
Timber/Canebrake Rattlesnake	*Crotalus horridus*	-	T

Source: Texas Parks and Wildlife Department, 2009
**Habitat prerequisites for this species are not present at the Matagorda TARS Site.*
E= Endangered T= Threatened

Brown Pelican. Brown pelicans are found along the Texas coast, including in Matagorda County. The majority of these pelicans nest on Pelican Island in Corpus Christi Bay and in Sundown Island. However, smaller groups of brown pelicans nest on Bird Island in Matagorda Bay, a series of older spoil islands in West Matagorda Bay, Dressing Point Island in East Matagorda Bay, and islands in Aransas Bay. Typical nesting habitat ranges from mud banks and spoil islands to offshore islands covered with mangroves and other woody vegetation (TPWD

2007a, Appendix H). Because this habitat type is not present at the Matagorda TARS Site, the potential for occurrence of the brown pelican within the site is minimal.

Eskimo Curlew. The Eskimo curlew is a medium-sized shorebird that is state and federally endangered, and possibly extinct. In the mid-1800s, huge flocks of these birds would pass through Texas during migration from their wintering grounds in South America to their northern nesting grounds in Alaska and Canada. The Eskimo curlew has been listed as endangered since 1967, with few sightings since (TPWD 2008, Appendix H). Therefore, due to the sparseness and possible extinction of this species, it is highly unlikely that it will occur at the Matagorda TARS Site.

Louisiana Black Bear. The Louisiana black bear was once a common inhabitant of forested regions in eastern Texas. Currently, this species is primarily found within the boundaries of Louisiana. However, there are occasional movements, particularly of solitary juvenile males, into eastern Texas. Typical habitat for this species is bottomland hardwood forests and other forested habitats. Other documented habitat types include brackish and freshwater marshes, salt dunes, wooded spoil levees along canals and bayous, and agricultural fields (TPWD 2007b, Appendix H). Because this type of habitat is not present at the Matagorda TARS Site, it is unlikely for the Louisiana black bear to occur within the site. In addition, the entire TARS Site is fenced in, therefore, the likelihood of Louisiana black bear within the site is low.

Northern Aplomado Falcon. The distribution of the aplomado falcon extends from Argentina, northward through Mexico, and into the southwestern United States. Historically, this falcon reached its northern limits in southeastern Arizona, southern New Mexico, and western and southern Texas. In southern Texas, this falcon preferred habitats of coastal prairies and marshes that supported small islands of trees and shrubs, or in wooded areas along freshwater drainages and estuaries. However, during the beginning of the 20th century, populations of aplomados drastically declined in the U.S., with sightings extremely rare after the 1940s. The last breeding of the aplomado falcon was reported in 1941 in Texas (TPWD 2007c, Appendix H). Because of the rarity of reports of aplomados in the U.S., it is highly unlikely for this falcon to occur at the site.

Ocelot. In Texas, ocelots prefer dense, thorny shrublands with a mixed brush species. In addition, suitable habitat consists of deep, fertile clay or loamy soils. Brush species that are typical of ocelot habitat include spiny hackberry, brasil, desert yaupon, wolfberry, lotebush, amargusa, white-brush, catclaw, blackbrush, lantana, guayacan, cenizo, elbowbrush, and Texas persimmon. Interspersed trees, such as mesquite, live oak, ebony, and hackberry may also occur. Optimal habitat has at least 95 percent canopy cover of shrubs, while marginal habitat has 75 to 95 percent canopy cover (TPWD 2007d, Appendix H). The ocelot is unlikely to occur at the Matagorda TARS Site due to lack of suitable habitat and the sparseness of the population.

Piping Plover. The piping plover is a migratory shorebird that winters along beaches of the Gulf Coast. Piping plovers spend more than 70 percent of the year at these wintering grounds. Common winter habitat includes beaches, sand flats, mudflats, algal mats, emergent sea grass beds, wash-over passes, and small dunes where seaweed (*Sargassum*) or other debris has accumulated sand. In Texas, piping plovers are commonly seen at Matagorda Island and along

the Intracoastal Waterway, which is approximately two miles away from the site. Texas winters more than 35 percent of the piping plover population (TPWD 2007e, Appendix H). Since the Intracoastal Waterway is within five miles of the site, there is a potential for these birds to be occasionally seen at the site. However, because the site does not contain the piping plover's preferred habitat, the potential for this species to occur at the Matagorda TARS Site for prolonged periods is minimal.

Red Wolf. Historically, the red wolf ranged throughout the eastern half of Texas. This wolf inhabited brushy and forested areas, as well as coastal marshes. However, this species began to quickly decline in numbers due to pressure from intensive land use. By 1980, all wild populations of the red wolf were extinct in Texas (Davis and Schmidly 1997, Appendix H). Therefore, there will be no occurrence of this species on the Matagorda TARS Site.

Whooping Crane. The whooping crane is the tallest bird of North America and it winters in the Aransas National Wildlife Refuge (NWR) on the Texas Coast (located approximately 40 miles southwest of the Matagorda TARS Site) and nests within Wood Buffalo National Park in Canada. In 2002, this population consisted of 50 nesting pairs, with a total of 185 cranes wintering in Texas. The whooping crane's primary habitat in Texas consists of approximately 22,500 acres of marshes and sand flats on Aransas NWR and adjacent wetlands (TPWD 2007f, Appendix H). It is unlikely that this species makes use of the Matagorda TARS Site.

3.8 AIR QUALITY

3.8.1 DEFINITION OF THE RESOURCE

The Clean Air Act (CAA) of 1977, as amended, requires federal facilities to comply with all federal, state, interstate, and local requirements regarding the control and abatement of air pollution in the same manner as any nongovernmental entity, including any requirement for permits. The "Conformity Rule" of the CAA states that all federal action must conform to appropriate State Implementation Plans (SIPs). This rule took effect on January 31, 1994, and at present applies only to federal actions in nonattainment areas (those not meeting the National Ambient Air Quality Standards [NAAQS] for the criteria pollutants in the CAA).

Pursuant to the CAA, the "Conformity Rule" (40 Code of Federal Regulations, Part 51) was created to ensure that actions by the federal government will neither cause nor aggravate a violation in air quality standards, nor delay timely attainment of standards. In other words, general conformity aims to prevent federal projects from jeopardizing a state's ability to achieve air quality standards. The "Conformity Rule" requires states to adopt and submit a general conformity SIP not later than November 30, 1994.

General Conformity in Texas. Texas submitted such a SIP on November 16, 1994. The federal rule was then incorporated for the most part into a state rule (30 TAC 101.30). Any project involving federal funds or requiring federal approval may be subject to the general "Conformity Rule." This rule applies in areas of the state designated as not meeting federal air quality standards (nonattainment areas) or in areas which have a history of nonattainment, but are currently meeting the standards (maintenance areas).

De Minimis Levels in Texas. The "Conformity Rule" establishes *de minimis*, or maximum, emission levels for tons per year (tpy) based on the severity of an area's air quality problem. These levels for nonattainment areas in Texas are identified in the following three tables (Table 3-5 through 3-7). If anticipated air emissions from a proposed federal action are below *de minimis* levels, then the project may proceed. If, on the other hand, emissions are expected to exceed the *de minimis* levels, a general conformity determination must be made by the federal agency involved.

Table 3-5
***De Minimis* Levels for Texas' Eight-Hour Ozone Nonattainment and Maintenance Areas**

Area	Classification	VOC tpy	NO_x tpy
Houston-Galveston (8-county area)	Moderate Ozone Nonattainment	100	100
Beaumont-Port Arthur (3-county area)	Marginal Ozone Nonattainment	100	100
Dallas-Fort Worth (9-county area)	Moderate Ozone Nonattainment	100	100

Source: TCEQ, 2009
**Note: These general conformity de minimis levels have been approved by the EPA.*

Table 3-6
***De Minimis* Levels for Texas' Carbon Monoxide Nonattainment Area**

Area	Classification	CO tpy
El Paso	Moderate	100

Source: TCEQ, 2009

Table 3-7
***De Minimis* Levels for Texas' PM_{10} Nonattainment Area**

Area	Classification	PM_{10} tpy
El Paso	Moderate	100

Source: TCEQ, 2009

In quantifying the emissions associated with a project, both direct and indirect emissions are included. Only emissions within the scope of the federal agency's authority are included. For example, a federal military facility expansion would be paid for and operated with federal money with every aspect of the project under the control of the DoD. Direct emissions such as construction activities are included, as well as indirect emissions, such as on-site emissions from the vehicles of military personnel associated with the facility.

Demonstrating Conformity. If emissions exceed *de minimis* levels, some options for demonstrating conformity include, but are not limited to:

- Identifying and accounting for the emissions in the latest EPA-approved SIP;

- Providing written assurance from the state that it will revise the SIP to include the project's emissions; and
- Offsetting emissions exceeding *de minimis* levels through a SIP revision, purchase of emission reduction credits, use of cleaner equipment, or by some other approved means.

Exemptions. The general conformity requirements do not apply to federal actions that:

- Occur in an attainment area;
- Result in total direct and indirect emissions that are less than the emission levels specified in Tables 3-5 thru 3-7 (*de minimus* threshold levels);
- NEPA final documentation completed prior to 3 January 1994;
- Are related to transportation plants, programs, and projects developed, funded, or approved under the Federal Transit Act (49 U.S.C. 1601);
- Qualify for exemptions (e.g. judicial and legislative proceedings; rulemaking and policy development; electric power marketing activities that involve the acquisition, sale, and transmission of electric energy; prescribed burning; and continuing responses to an emergency or disaster);
- Result for alteration and additions to existing structures that are required by environmental legislation;
- Result from remedial actions carried out under CERCLA; or
- Are related to federal actions that are part of disaster response.

Nonattainment Areas in Texas. Nonattainment areas are areas that have failed to meet federal standards for ambient air quality. Near nonattainment areas currently meet federal standards but are at risk of violating standards. Texas meets federal air quality standards with the following exceptions: (1) carbon monoxide and particulate matter in El Paso; and (2) eight-hour ground-level ozone in Houston-Galveston-Brazoria, Dallas-Fort Worth, and Beaumont-Port Arthur (Table 3-8 and Figure 3-8). Maintenance areas are areas that were once designated in nonattainment of federal standards, but which have been redesignated in attainment of those standards.

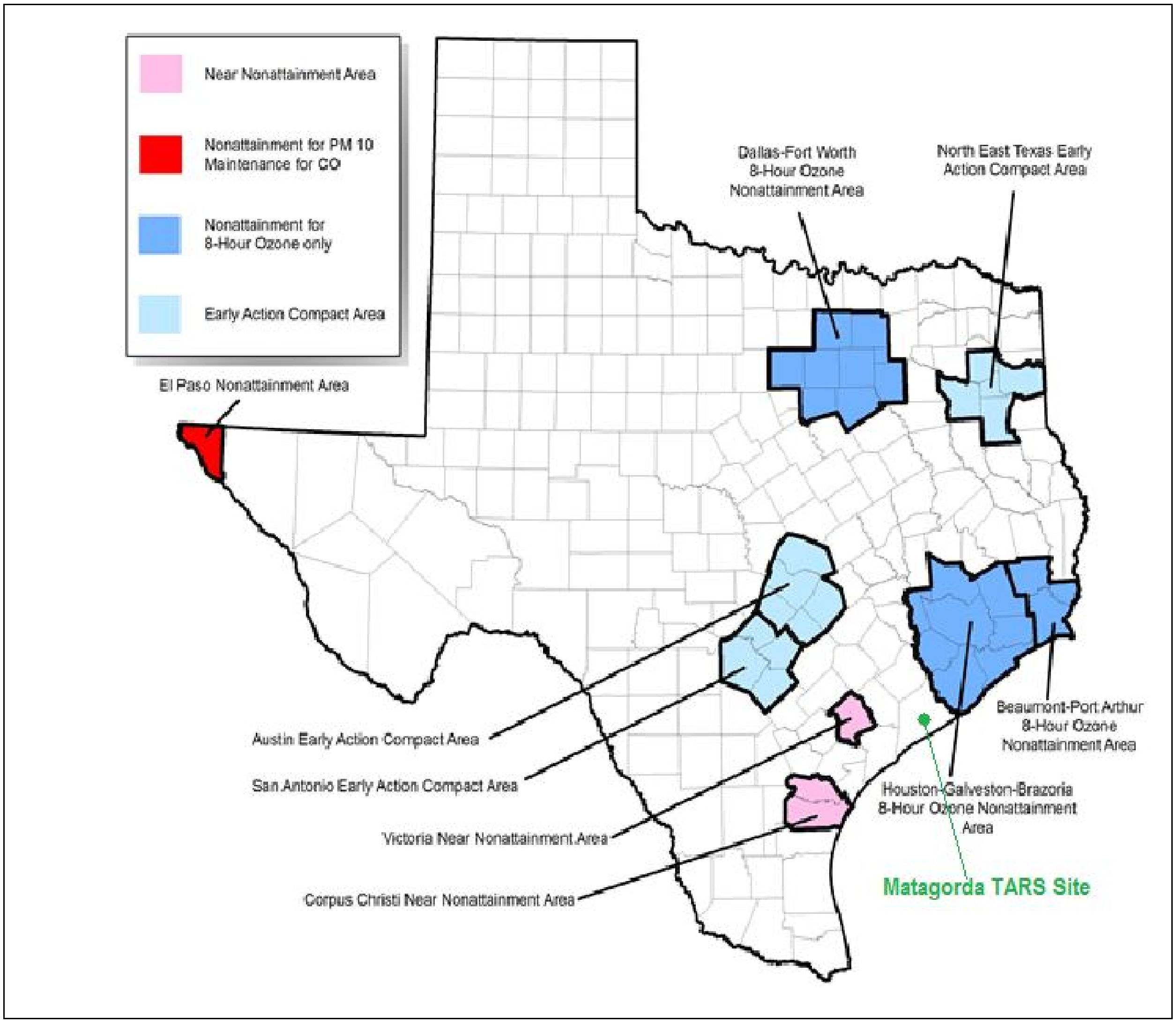
Texas also has three Early Action Compact (EAC) areas: Austin, San Antonio, and Northeast Texas. These areas have submitted EAC plans which on November 17, 2004, were utilized to develop SIP strategies to reduce emission standards to meet the eight-hour ozone standard by 2007.

Table 3-8
Nonattainment and Ozone Early Action Compact Areas in Texas

Nonattainment Area	Counties	Classification	Attainment Date Required by EPA
Eight-Hour Ozone Nonattainment Areas			
Houston-Galveston-Brazoria (HGB)	Brazoria Chambers Fort Bend Galveston	Severe	June 15, 2019

Nonattainment Area	Counties	Classification	Attainment Date Required by EPA
	Harris Liberty Montgomery Waller		
Dallas-Fort Worth (DFW)	Collin Dallas Denton Tarrant Ellis Johnson Kaufman Parker Rockwall	Moderate	June 15, 2010
Beaumont-Port Arthur (BPA)	Hardin Jefferson Orange	Moderate	June 15, 2010
Ozone Early Action Compact (EAC) Areas			
Austin-San Marcos (AUS)	Travis Williamson Bastrop Hays Caldwell	Attainment	December 31, 2007
San Antonio (SA)	Bexar Comal Guadalupe Wilson	Attainment	December 31, 2007
Northeast Texas (NET)	Rusk Smith Upshur Gregg Harrison	Attainment	December 31, 2007
Carbon Monoxide (CO) Nonattainment Areas			
El Paso (ELP)	El Paso	Maintenance	N/A
Particulate Matter 10 (PM10) Nonattainment Areas			
El Paso (ELP)	El Paso	Moderate	December 31, 1994

Source: http://tceq.state.tx.us/implementation/air/sip/siptexas.html



Source: TCEQ, http://www.tceq.state.tx.us/implementation/air/sip/siptexas.html

Figure 3-8
Map of Texas' Nonattainment and Near Nonattainment Areas

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Table 3-9
National Ambient Air Quality Standards

	Standard Value		
Pollutant	**Federal**	**State**	**Standard Type**
Carbon Monoxide (CO)			
8-hour average[a]	9 ppm	9.5 ppm	Primary
1-hour average[a]	35 ppm	35.5 ppm	Primary
Nitrogen Dioxide (NO_2)			
Annual Arithmetic Mean	0.053 ppm	51 µg/m^3	Primary and Secondary
Ozone (O_3)			
8-hour average[b]	0.075 ppm	0.076 ppm	Primary and Secondary
1-hour average[c]	0.12 ppm	--	Primary and Secondary
Lead (Pb)			
Quarterly Average	1.5 µg/m^3	1.55 µg/m^3	Primary and Secondary
Particulate Matter (PM_{10})			
Annual Arithmetic Mean	--	51 µg/m^3	Primary and Secondary
24-hour average	150 µg/m^3 [d]	155 µg/m^3	Primary and Secondary
Particulate Matter ($PM_{2.5}$)			
Annual Arithmetic Mean[e]	15 µg/m^3	15.1 µg/m^3	Primary and Secondary
24-hour Average[f]	35 µg/m^3	66 µg/m^3	Primary and Secondary
Sulfur Dioxide (SO_2)			
Annual Arithmetic Mean	0.03 ppm	0.035 ppm	Primary
24-hour average[a]	0.14 ppm	0.145 ppm	Primary
3-hour average[a]	0.5 ppm	--	Secondary

Source: U.S. Environmental Protection Agency, 2009

Notes:
(a) Not to be exceeded more than once per year.
(b) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm
(c) As of June 15, 2005, USEPA revoked the Federal 1-hour ozone standard in all areas except the 14 8-hour ozone nonattainment Early Action Compact Areas.
(d) Not to be exceeded more than once per year on average over 3 years.
(e) To attain this standard, the 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m3.
(f) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m3.

National Ambient Air Quality Standards (NAAQS). The CAA authorizes EPA to establish NAAQS to protect health and public welfare and to regulate emission of hazardous air pollutants. The EPA Office of Air Quality Planning and Standards (OAQPS) has set NAAQS for six “criteria” pollutants, including carbon monoxide, lead, nitrogen dioxide, particulate matter (PM_{10} and $PM_{2.5}$), ozone, and sulfur dioxide. The CAA established two types of national air quality standards: primary standards and secondary standards. Primary standards set limits to protect public health, including the health of sensitive populations, such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. Table 3-9 presents the NAAQS set by the EPA and the state of Texas air quality standards.

3.8.2 EXISTING CONDITIONS

The facility is no longer active and is in cold storage. Therefore, air emissions related to the operation of on-site machinery and equipment, and to personnel transportation do not exist.

The U.S. EPA classifies the air quality in an air quality control region, or in subareas of a region, according to whether the concentrations of criteria pollutants in ambient air exceed the NAAQS. Areas within each region are therefore designated as either “attainment,” “nonattainment,” “maintenance,” or “unclassified” for each of the six criteria pollutants. Attainment means that the air quality within a region is better than the NAAQS; nonattainment indicates that criteria pollutant levels exceed NAAQS. The Matagorda TARS Site lies within a region of attainment, and therefore complies with the NAAQS.

3.9 AIR SPACE

3.9.1 DEFINITION OF THE RESOURCE

Airspace includes any specific three-dimensional portion of the atmosphere. Airspace can be further divided into a variety of areas and zones, including those where there are restrictions on flying activities or complete prohibition of flying activities. The airspace above the Matagorda TARS Site is classified as restricted airspace. Restricted airspace is an area of airspace in which the local controlling authorities have determined that air traffic must be restricted for safety or security concerns. According to the Federal Aviation Administration (FAA), “Restricted areas denote the existence of unusual, often invisible, hazards to aircraft such as artillery firing, aerial gunnery, or guided missiles. Penetration of restricted areas without authorization from the using or controlling agency may be extremely hazardous to the aircraft and it occupants.”

3.9.2 EXISTING CONDITIONS

The Matagorda TARS Site is located beneath Restricted Area R-6320, which is positioned within a three-mile circle centered at latitude 28˚42’37” North, longitude 95˚57’26” West. This Restricted Area extends upward from the TARS Site to an elevation of 15,000 feet MSL and outward 1.5 nautical miles. On March 15, 2007, the time of designation for R-6320 changed from “Continuous” to “Intermittent by [Notice to Airmen] NOTAM.” The FAA issued this amendment because R-6320 was no longer continuously needed for the aerostat balloon, since

the site was in cold storage. On December 10, 2008, the Air Force requested that the FAA change the using agency for R-6320 from Customs to Continental North American Aerospace Defense Command Region (CONR). This request was based on the Air Force's interest in retaining the restricted area and expected funding in the future to purchase and house another aerostat system within that restricted airspace. This change became effective on May 7, 2009. No changes to the boundaries, altitudes, time of designation, or activities conducted within the restricted area occurred due to this change.

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4.0 ENVIRONMENTAL CONSEQUENCES

4.1 LAND USE, VISUAL RESOURCES, AND RECREATION

4.1.1 PROPOSED ACTION

Land Use. Under the Proposed Action, all existing buildings and infrastructure at the Matagorda TARS Site would remain in place. Land use would change since the landowner would resume control of the site, and the site would no longer be used for military purposes. In addition, no effects would be made to the surrounding land.

Visual Resources. No changes would occur to the visual resources of the site under the Proposed Action. All buildings and infrastructure would remain the same.

Recreation. Under the Proposed Action, the TARS Site would be returned to the landowner. Since it is unknown what the landowner would do with the property, it is unknown whether recreational activities would be affected. However, since no recreational activities currently exist at the site, no negative effects to these activities would occur.

4.1.2 ALTERNATIVE A

Land Use. Implementation of Alternative A would have no significant effect on the land use of nearby or adjacent areas to the site. However, following demolition and restoration of the site, it is possible for the site to return to ranching operations. Land use at the site would also change since it would no longer be used for military purposes.

Visual Resources. The visual resources at the Matagorda TARS Site would be temporarily affected under this alternative. During the demolition process, aesthetics of the area would be unappealing; however, this is a short-term effect. All buildings and infrastructure at the site would be removed and restoration would occur. Following restoration, the site would resemble its natural state of undeveloped open land, resembling adjacent areas.

Recreation. No significant effect would occur under implementation of Alternative A. No recreation activities currently exist at the site; therefore, none can be affected following the demolition and restoration of the site.

4.1.3 ALTERNATIVE B (NO-ACTION ALTERNATIVE)

Under Alternative B (No-Action Alternative), no changes in the status of the Matagorda TARS Site would result. All existing buildings and infrastructure at the site would remain intact and the site would remain in cold storage. Therefore, no change in land use, visual resources, or recreation would occur upon implementation of the Alternative B (No-Action Alternative). In addition, no significant change would take place to adjacent or nearby land.

4.2 SOCIOECONOMICS, DEMOGRAPHICS, AND ENVIRONMENTAL JUSTICE

4.2.1 PROPOSED ACTION

Implementation of the Proposed Action would have a slight negative effect on socioeconomics at the site. The TARS site is currently in caretaker status, employing contract maintenance and security personnel. However, once the property is transferred to the landowner, these personnel potentially would no longer be needed. However, we cannot assume the future plans of the landowner. Environmental justice would not be affected under the Proposed Action.

4.2.2 ALTERNATIVE A

The implementation of Alternative A would positively affect socioeconomics at the site in the short-term. Creation of short-term jobs would become available during site demolition and restoration. However, these beneficial effects are small and short-term. Implementation of this alternative would not be expected to result in long-term significant effects to the local economy or socioeconomic conditions. In addition, no issues concerning Environmental Justice would result under this alternative.

4.2.3 ALTERNATIVE B (NO-ACTION ALTERNATIVE)

The Matagorda TARS Site became deactivated in October 2002, resulting in the loss of the Site's employees. However, the site currently does not employ any personnel, except contract grounds maintenance and security personnel that visit the site periodically. Therefore, no significant effect would occur at the site under Alternative B (No-Action Alternative). Employment, housing, and other socioeconomic factors would not be affected under this alternative.

4.3 CULTURAL RESOURCES

4.3.1 PROPOSED ACTION

The Proposed Action does not include any earth-disturbing activities that might present a potential for affecting archaeological or cultural resources. In addition, there are no known cultural resources present at the site. Therefore, implementation of the Proposed Action would present no potential for effects to cultural resources.

4.3.2 ALTERNATIVE A

Under Alternative A, all buildings and infrastructure would be removed. Since the site was built in 1992, none of the buildings are considered of historic value. There would be earth-disturbing activities that take place during demolition of the site. However, because no known archaeological or cultural resources exist at the site, a significant effect would not occur under implementation of this alternative. In 2000, the State Historic Preservation Office (SHPO) concurred that no significant effect would occur to cultural resources at the site due to demolition and restoration activities (Appendix A).

4.3.3 ALTERNATIVE B (NO-ACTION ALTERNATIVE)

Alternative B (No-Action Alternative) involves no earth-disturbing activities that could potentially affect any archaeological or cultural resources. In addition, there is no indication of any significant cultural resources at the site. Therefore, this alternative would produce no significant effects to cultural resources at the site.

4.4 INFRASTRUCTURE

4.4.1 PROPOSED ACTION

The Proposed Action would not affect the infrastructure of the site. All buildings, roads, pavements, etc. would remain intact. In addition, all electrical lines would remain in place. Currently, the TARS Site has no electricity or phone services provided since it is in cold storage. It is unknown if the landowner would resume electricity services following transfer of the property. Included in the Proposed Action, all solid waste currently at the site will be properly handled, stored, transported, and disposed of in accordance with federal, state, and local laws and regulations prior to the transfer of the property and facility.

4.4.2 ALTERNATIVE A

Under implementation of Alternative A, all buildings and infrastructure, including roads and parking lots, would need to be removed within the site. Temporary traffic may result as a short-term effect during the demolition and restoration activities. However, after the site is restored to its original state, there would be no significant effect to the transportation of the area.

Since the Matagorda TARS Site is currently in cold storage, no utility services are operational. Therefore, no significant effect would occur to the utilities at the site under Alternative A. However, under implementation of this alternative, a significant amount of solid waste would be generated during the demolition process. All buildings, concrete, equipment, roads, etc will be properly handled, stored, transported, and disposed of in accordance with federal, state, and local laws and regulations prior to the transfer of the property and facility. The production of this solid waste is only temporary and would not have a significant effect on the site following demolition.

4.4.3 ALTERNATIVE B (NO-ACTION ALTERNATIVE)

Under Alternative B (No-Action Alternative), the infrastructure would remain the same at the Matagorda TARS Site. All buildings, roads, and parking lots would remain intact and would remain not used since the site employs no personnel, except contract grounds maintenance and security personnel that visit the site periodically. In addition, all utility services would remain inactive.

4.5 PHYSICAL RESOURCES

4.5.1 PROPOSED ACTION

Geological Resources. The Proposed Action involves returning the Matagorda TARS Site to the landowner with all buildings and infrastructure remaining intact. Therefore, no earth-disturbing activities would take place that present the potential to affect the site's topography, soils, etc. Therefore, there would be no significant effect to the geological resources at the site under the Proposed Action.

Water Resources. No significant effect of surface or groundwater would occur under implementation of the Proposed Action. In addition, no other change in site discharge would result.

4.5.2 ALTERNATIVE A

Geological Resources. Alternative A would have no effect on the geological resources of the site, such as alteration of the topography or disturbance of geologic features. However, fence, road, and infrastructure removal would expose and disturb on-site soils, resulting in temporary exposure to wind and water erosion. Therefore, implementation of Alternative A may affect the site's soils. To control erosion and discharge of sediment during the demolition process, the following objectives should be followed:

- Minimize Disturbed Areas: Only clear land that will be actively under construction immediately, minimize disturbance during the rainy season, and avoid clearing and disturbing sensitive areas (e.g. steep slopes and natural watercourses).
- Stabilize Disturbed Areas: Provide temporary stabilization of disturbed soils whenever active demolition is not occurring at the site. Provide permanent stabilization during finish grade and landscape of the site. Various stabilization techniques include installing temporary vegetation, blankets and matting, mulch, sod, interceptor swales, diversion dikes, erosion control compost, mulch filter berms and socks, compost filter berms and socks, sand bag berms, silt fences, triangular filter dikes, rock berms, hay bale dikes, brush berms, stone outlet sediment traps, and sediment basins. For more information on installing these stabilization techniques, see Appendix H, page H-32.
- Protect Slopes and Channels: Convey runoff from the top of slopes and stabilize disturbed slopes as soon as possible. In addition, avoid disturbing natural channels and stabilize any temporary or permanent channel crossings immediately.
- Control Site Perimeter: Delineate site perimeter to prevent disturbing areas outside the project limits.
- Retain Sediment: Retain sediment-laden water from disturbed, active areas within the site.

The TCEQ recommends the following control methods following demolition activities: retention/irrigation systems, extended detention basins, vegetative filter strips, constructed wetlands, wet basins, grassy swales, sand filter systems, erosion control compost, mulch filter

berms and socks, and compost filter berms and socks. Appendix H, page H-53 contains additional information on these methods.

Following demolition activities, rehabilitation of the site would need to occur. Rehabilitation includes restoring the site to its original condition prior to the TARS Site being built. This would require replanting the site with vegetation native to the area. Following rehabilitation of the site, no significant effect to geological resources would result.

Water Resources. Implementation of Alternative A would result in earth-disturbing activities (any stripping of vegetation, grading, excavating, filling, or other alteration of the earth's surface in which natural or man-made ground cover is destroyed). This could raise the potential for short-term increases in sediment runoff, which could affect nearby water resources. Runoff can be attributed to many things, including the amount of rainfall, soil conditions, and the degree of urbanization. However, during demolition, silt fences would be installed, which would prevent sediment runoff from leaving the site and entering receiving waters. Receiving waters are any rivers, lakes, streams, or other bodies of water into which wastewater or treated effluent is discharged. Since the topography at the site is relatively flat, installations of silt fences would be sufficient in reducing sediment runoff, thus preventing water erosion, to a point where no significant effect would result under the alternative. Nevertheless, any sediment runoff that reaches receiving waters is a short-term effect that would not result in long-term degradation of surface water quality.

4.5.3 ALTERNATIVE B (NO-ACTION ALTERNATIVE)

Under Alternative B (No-Action Alternative), no effects would occur to the geologic and water resources at the site. The topography, quality of soils, and the quality of surface and groundwater resources would remain the same since no changes would occur.

4.6 HAZARDOUS MATERIALS AND WASTE MANAGEMENT

4.6.1 PROPOSED ACTION

Under the Proposed Action, any hazardous materials or wastes present onsite would be properly handled, stored, transported, and disposed of in accordance with federal, state, and local laws and regulations prior to transfer of the property and facility. This would not result is a significant environmental effect due to the small quantity of waste that needs disposal.

4.6.2 ALTERNATIVE A

There are no ACMs or other similar materials present at the Matagorda TARS Site that could be potentially released during demolition. Any hazardous materials or waste that is discovered during the demolition process would need to be properly classified, handled, transported, and disposed of in accordance with federal, state, and local laws and regulations. There is the potential for LBP to be present within the concrete launching pad and various other areas. If Alternative A were implemented, the contractor would be made aware of the potential that LBP is present. The contractor can then take the necessary actions to test the paint for lead content

and, if needed, comply with OSHA Regulation 29 CFR 1926.62 and RCRA Regulation 40 CFR 261.24. These regulations require handling the waste as hazardous if the lead content exceeds five milligrams per liter (mg/L). If the lead content does not exceed this amount, no special handling is required.

Another alternative to disposing of the LBP as a hazardous waste (if the lead content exceeds five mg/L) is to crush and recycle the concrete that contains the LBP. This alternative is less costly and conserves landfill space. Under implementation of Alternative A, recycling the concrete at the site would be a viable option. If this material were properly disposed of, there would be no significant effect under implementation of Alternative A.

4.6.3 ALTERNATIVE B (NO-ACTION ALTERNATIVE)

The Matagorda TARS Site is not currently producing any hazardous materials or hazardous wastes, since the site is not operational. Therefore, no effect would occur if Alternative B (No-Action Alternative) were implemented. However, until demolition of the site occurs, it would be unknown if any LBP exists. Therefore, under this alternative, if LBP were present at the site it would remain intact. Since the site would remain in cold storage under this alternative, the potential for any spills of hazardous materials or waste would be nonexistent.

4.7 BIOLOGICAL RESOURCES

4.7.1 PROPOSED ACTION

Terrestrial Communities and Wildlife. Under the Proposed Action, all buildings and infrastructure would remain in-place at the Matagorda TARS Site. Therefore, local wildlife species and vegetation currently seen at the site would experience no change.

Wetlands. No wetlands occur at the Matagorda TARS Site; therefore, none would be affected. In addition, nearby or adjacent wetlands would not be affected by the Proposed Action.
Threatened, Endangered, and Special Status Species. Under the Proposed Action, no demolition activities would occur. Therefore, implementation of the Proposed Action would have no effect on the potential for threatened, endangered, or special status species to occur at the site.

4.7.2 ALTERNATIVE A

Terrestrial Communities and Wildlife. The vegetation currently present at the Matagorda TARS Site consists of landscaped grass. This grass would be affected during demolition of the site. However, following demolition, restoration of the site would occur, which includes seeding and revegetation of the area. The site would return to conditions similar to those that existed prior to construction of the TARS facility. TPWD recommends seeding the site with a mixture of native herbaceous species. The long-term effect to the vegetation of the area is considered positive since its natural condition would be restored.

Wildlife species may be affected in the short-term during demolition activities. However, long-term effects would be beneficial to wildlife species since the site would be reseeded to its

original state. This would open up habitat for a variety of species, particularly those who prefer openland or grassland habitats. Although threatened and endangered species have a low potential to occur at the site, demolition activities would have a short-term negative effect on these species, if they were to occur. However, following restoration of native vegetation to the site, habitat may open up for certain threatened and endangered species.

Wetlands. There are no wetlands present at the TARS Site; therefore, no significant effects would occur under implementation of Alternative A. In addition, there would be no significant effects that occur to the wetlands near the area.

Threatened, Endangered, and Special Status Species. According to the TPWD's Natural Diversity Database (NDD), there are no known occurrences of threatened or endangered species within 1.5 miles of the Matagorda TARS Site. However, eight species protected under the ESA have the potential to be present at the Matagorda TARS Site (brown pelican, Eskimo curlew, northern aplomado falcon, piping plover, whooping crane, Louisiana black bear, ocelot, and red wolf). However, the habitat type preferred by each of these species is not present at the site. In addition, none of these species are known to make use of the site. However, some might pass through the area on occasion, such as the piping plover. If during demolition or restoration activities, workers encounter protected, threatened, or endangered species at the site, the work should cease and appropriate informal discussions or consultation should be undertaken with the TPWD to address avoiding or minimizing significant impact to the species. There have been no biological surveys conducted at the TARS Site given the facts that this habitat is not preferred, the potential for an occurrence by any species is low, and no actual occurrences have been documented. Implementation of Alternative A would not be expected to have a significant effect on any of these species.

4.7.3 ALTERNATIVE B (NO-ACTION ALTERNATIVE)

The status of wildlife and threatened and endangered species at the Matagorda TARS Site would not be affected under Alternative B (No-Action Alternative). Any wildlife species that habituates the site is likely to remain present following the implementation of this alternative. Wetlands are present near the site, but would not be affected under Alternative B (No-Action Alternative). In addition, all vegetation that is currently intact at the site would remain the same.

4.8 AIR QUALITY

The CAA prohibits federal agencies from supporting activities that do not conform to a SIP that has been approved by the EPA. To assess the effects of the Alternative A proposal (complete demolition of all buildings and infrastructure), analysis must include direct and indirect emissions from all activities that would affect the regional air quality. Emissions from proposed actions are either "presumed to conform" (based on emission levels which are considered insignificant in the context of overall regional emissions) or must demonstrate conformity with approved SIP provisions.

4.8.1 PROPOSED ACTION

The implementation of the Proposed Action would not have any negative impacts on the regional air quality because it does not include any demolition activities. In addition, there are no commuting personnel at the site; therefore, there would be no contribution to any air pollution.

4.8.2 ALTERNATIVE A

If Alternative A were implemented, negligible amounts of particulate matter (PM_{10}) would affect the air quality at the Matagorda TARS Site, as shown below in Table 4-1. Impacts to air quality associated with demolition activities would be short-term and contribute less than one percent to the regional air emissions, thereby not presenting any significant adverse impacts to regional air quality.

The emissions associated with Alternative A activities include: (1) fugitive dust (PM_{10}) from any demolition, fill, and grading; and (2) combustion (primarily CO and NO_x, and smaller amounts of VOCs, SO_x, and PM_{10}) from heavy-duty diesel construction/demolition equipment exhaust (e.g., trucks, dozers, cranes, and rollers).

Applicable demolition emissions were calculated using the Air Force Air Conformity Applicability Model (ACAM), Version 4.4.14 software (AFCEE 2009). ACAM is a computer model used by Air Force planners and Environmental Impact Analysis Process (NEPA) personnel to determine general conformity applicability for proposed federal actions in nonattainment or maintenance designated areas. The model provides for a uniform, acceptable, and automated tool for Air Force use. ACAM produces an estimate of the conformity-related emissions providing sufficient detail for a conformity applicability analysis, and a jumping platform for a refined analysis and a formal conformity determination. Appendix J provides screenshots of the ACAM input data used to calculate these emissions.

Table 4-1
Air Emissions for Implementation of Alternative A

Name	Size	Dimensions	CO	NO_x	SO_2	VOC	PM_{10}	$PM_{2.5}$
Operations Building	54,000 Cubic Feet (ft^3)	60’ x 60’ x 15’	0	0	0	0	0.10	0
Vehicle Maintenance Building	12,000 ft^3	40’ x 30’ x 10’	0	0	0	0	0.02	0
Payload Service Building	60,000 ft^3	60’ x 50’ x 20’	0	0	0	0	0.11	0
Security Building	60 ft^3	20’ x 10’ x 8’	0	0	0	0	0	0
Mechanical Building	48 ft^3	16’ x 10’ x 8’	0	0	0	0	0	0

Name	Size	Dimensions	CO	NO_x	SO_2	VOC	PM_{10}	$PM_{2.5}$
Hazardous Waste Building	30 ft^3	10’ x 10’ x 8’	0	0	0	0	0	0
Electric Power Station Building	3,080 ft^3	22’ x 14’ x 10’	0	0	0	0	0.01	0
TOTAL	**N/A**	**N/A**	**0**	**0**	**0**	**0**	**0.24**	**0**

Source: ACAM, 2009

Based on emissions levels that are considered insignificant in the context of overall regional emissions, Alternative A demonstrates conformity with Texas’ approved SIP provisions.

4.8.3 ALTERNATIVE B (NO-ACTION ALTERNATIVE)

No significant effects would occur upon implementation of Alternative B (No-Action Alternative). Because the site would remain in cold storage, no employees would be employed at the site, nor would there be any operation of machinery at the site. Therefore, air quality would not be affected through commuting of vehicles or operation of machinery under Alternative B (No-Action Alternative).

4.9 AIRSPACE

4.9.1 PROPOSED ACTION

Under implementation of the Proposed Action, Restricted Area R-6320, would no longer be needed by the Air Force and would be removed.

4.9.2 ALTERNATIVE A

Under implementation of Alternative A, the restricted airspace, R-6320, would no longer be needed and would be removed.

4.9.3 ALTERNATIVE B (NO-ACTION ALTERNATIVE)

Under Alternative B (No-Action Alternative), airspace ownership would remain the same.

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5.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

5.1 CUMULATIVE EFFECTS

This chapter provides (1) a definition of cumulative effects, (2) a description of past, present, and reasonably foreseeable actions relevant to cumulative effects, and (3) an evaluation of cumulative effects potentially resulting from these interactions.

5.1.1 DEFINITION OF CUMULATIVE EFFECTS

The Council on Environmental Quality (CEQ) regulations stipulate that the cumulative effects analysis within an EA should consider the potential environmental effects resulting from "the incremental effects of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). Recent CEQ guidance in *Considering Cumulative Effects* affirms this requirement, stating that the first steps in assessing cumulative effects involve defining the scope of the other actions and their interrelationship with the Proposed Action. The scope must consider geographic and temporal overlaps among the Proposed Action and other actions. It must also evaluate the nature of interactions among these actions.

Cumulative effects are most likely to arise when a relationship or synergism exists between a Proposed Action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with, or in close proximity to, the Proposed Action would be expected to have more potential for a relationship than actions that may be geographically separated. Similarly, actions that coincide, even partially, in time would tend to offer a higher potential for cumulative effects.

To identify cumulative effects, this EA addresses three questions:

1. Does a relationship exist such that elements of the Proposed Action might interact with elements of past, present, or reasonably foreseeable actions?
2. If one or more of the elements of the Proposed Action and another action could be expected to interact, would the Proposed Action affect or be affected by effects of the other action?
3. If such a relationship exists, does an assessment reveal any potentially significant effects not identified when the Proposed Action is considered alone?

In this EA, an effort has been made to identify all actions that are being considered and that are in the planning phase at this time. To the extent that details regarding such actions exist and the actions have a potential to interact with the Proposed Action and Alternative B (No-Action Alternative) in this EA, these actions are included in this cumulative analysis. This approach enables decision makers to have the most current information available so that they can evaluate the environmental consequences of the Proposed Action and Alternative B (No-Action Alternative).

5.1.2 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

This EA applies a stepped approach to provide decision makers with not only the cumulative effects of the Proposed Action, Alternative A, and Alternative B (No-Action Alternative), but also the incremental contribution of past, present, and reasonably foreseeable actions.

Past and Present Actions Relevant to the Proposed Action and Alternatives

The South Texas Nuclear Power Plant, located in Wadsworth, Texas, is in the process of adding two nuclear power plants. Wadsworth is approximately 11 miles away from the Matagorda TARS Site. Therefore, construction of these two plants could affect the TARS Site. This six billion dollar investment will create over 3,000 construction jobs and result in over 1,000 permanent jobs between 2009 and 2011.

Reasonably Foreseeable Future Actions

The Air Force is presently considering demolition and restoration of the Morgan City TARS Site in St. Mary Parish, Louisiana. If this action is implemented it would occur near the same time as the Proposed Action.

5.1.3 CUMULATIVE EFFECTS ANALYSIS

Construction of two power plants at the South Texas Nuclear Power Plant in Wadsworth, Texas could temporarily affect the Matagorda TARS Site. Minor adverse effects on air quality, geological resources, water resources, biological resources, and socioeconomic resources could result from the cumulative effects of the construction project. However, these effects would more than likely be short-term and localized.

Demolition and restoration of the Morgan City TARS Site would not affect the implementation of the Proposed Action. The Matagorda and Morgan City TARS Sites are located far enough apart (approximately 270 miles) that actions occurring at one site would have no effect on the other site. The effects of actions taken at the Morgan City TARS Site would be primarily focused in the area of St. Mary Parish, Louisiana, while that of the Proposed Action would be primarily focused in Matagorda County, Texas.

5.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible and irretrievable resource commitments refer to the use of nonrenewable resources and the effects that use of these resources would have on future generations. The irreversible and irretrievable commitments of resources that would result from implementation of the Proposed Action involve the irretrievable commitment of fossil fuels, the consumption of energy resources and human labor resources.

Energy Resources. Energy resources used for the Proposed Action would be irretrievably lost. These include petroleum-based products (such as gasoline and diesel) that would be needed to mow the property, prior to returning to the landowner. No additional energy resources would be used since all cleanup of solid waste and debris would be completed prior to implementation of the Proposed Action.

Human Resources. The use of human resources for activities involved in the Proposed Action is considered an irretrievable loss because it prevents personnel from engaging in other work activities. However, the only personnel needed for implementation of the Proposed Action is the personnel that would mow the property.

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7.0 REFERENCES

Davis, William B., and David J. Schmidly. (1997). Red *Wolf*. Retrieved from Mammals of Texas—Online Edition at http://www.nsrl.ttu.edu/tmot1/canirufu.htm.

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FINDING OF NO SIGNIFICANT IMPACT

1.0 NAME OF THE PROPOSED ACTION

Environmental Assessment (EA) for the proposed action to terminate the lease and transfer the Matagorda Tethered Aerostat Radar System (TARS) Site located in Matagorda County, Texas, to the landowner with the existing structures, utility systems, pavements, and fences remaining in place.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

An EA was prepared to evaluate the potential environmental impacts of the full implementation of the Proposed Action.

Proposed Action
The Proposed Action includes terminating the lease and returning the Matagorda TARS Site to the landowner, Braman Ranches LLC., with all existing structures, utility systems, and pavements remaining in place. Under this action, all solid waste, debris, maintenance equipment, office equipment, and tools will be removed from the site. In addition, the Air Force will mow the property prior to the transfer of property.

Alternative A
Under Alternative A, the Air Force proposes to demolish the TARS Site located in Matagorda, Texas, and to restore the property to its original configuration. This would include the removal of the buildings and site infrastructure. In addition, it would involve potential earth disturbance over a substantial portion of the site. However, the majority of the disturbance is expected to be insignificant, only involving approximately the top foot of soil, except where foundations, underground utility lines, and manholes are removed.

Alternative B (No-Action Alternative)
Under the No-Action Alternative, no change would occur at the Matagorda TARS Site. The USAF would continue to lease the property. The site would remain in cold storage, employing no personnel, except contract grounds maintenance and security personnel. The environmental and socioeconomic conditions would remain unchanged, and the government would continue making lease payments to the owner of the property.

3.0 ENVIRONMENTAL IMPACTS

In general, no significant impacts were identified during the evaluation of the proposed action. The following resources and infrastructure requirements were identified and evaluated as having no significant impacts:

- Land Use, Visual Resources, and Recreation: no impacts

- Socioeconomics and Environmental Justice: temporary negative impact due to the maintenance and security personnel's loss of jobs. However, this impact is negligible.
- Cultural Resources: no impacts
- Infrastructure: no impacts
- Physical Resources: no impacts
- Hazardous Materials and Waste: no impacts
- Biological Resources: no impacts
- Air Quality: no impacts

4.0 CONCLUSION

Based on the findings of the Environmental Assessment, no significant impact is anticipated from implementation of the Proposed Action. A Finding of No Significant Impact is warranted and an environmental impact statement is not required for this action.

DIMOSALANG F. JUNIO, Colonel, USAF Chief, Programs Division HQ ACC/A7P	Date

Appendix A
Scoping Letters

Matagorda Tethered Aerostat Radar System (TARS) Site Mailing List

U.S. Fish and Wildlife Service
Southwest Regional Office
P.O. Box 1306
Albuquerque, NM 87103-1306

U.S. Department of Agriculture
Natural Resources Conservation Service
Texas State Office
101 South Main
Temple, TX 76501

Texas Parks and Wildlife Department
4200 Smith School Road
Austin, TX 78744

Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087

Texas Historical Commission
P.O. Box 12276
Austin, TX 78711-2276

Matagorda County Environmental Health
2200 7th Street
Bay City, TX 77414

ENVIRONMENTAL EXPRESS SERVICES, INC.
5944 FM 1863
Bulverde, Texas 78163
Telephone 830-980-1830 Fax 830-980-1831
www.envexpress.com

March 11, 2009

Matagorda County Environmental Health
2200 7th Street
Bay City, TX 77414

Dear Sir/Madam,

Environmental Express Services, Inc (EES) has been retained to prepare an Environmental Assessment (EA) for a proposed action by the Air Force. This action would occur at the Matagorda Tethered Aerostat Radar System (TARS) Site that is located approximately 1-1/2 miles northeast of Matagorda in Matagorda County, Texas. This site is located off Highway 60 at the following coordinates 28° 42' 38" North, 95° 57' 28" West. The TARS site encompasses approximately 23 acres configured in a 1,000-foot square.

The U.S. Air Force Air Combat Command assumes responsibility of the Matagorda TARS site. This site is one of a series of similar sites that stretch along the southern coast of the United States. The purpose of these systems is to detect smuggling operations approaching the coast. The Matagorda TARS site became active in 1994. In 2002, however, the site closed and was deactivated.

Under this proposed action, the Matagorda TARS site would be demolished and restored as close as possible to its original condition. This would include the removal of the buildings and site infrastructure. In addition, it would involve potential earth disturbance over a substantial portion of the site. The majority of the disturbance is expected to be relatively superficial, only involving approximately the top foot of soil. However, in the center of the site is a 700 square foot underground concrete and steel pier, which served as an anchor point for the aerostat. This consists of 12 individual piers that are 6 to 8 feet deep. In addition, beneath the Operations Building are 60 piers that are 2 feet in diameter and 12 feet in depth. Removal of these piers would be the most extensive activity involving earth disturbance that would occur at the Matagorda TARS site.

We are in the data-gathering process for the preparation of the EA. We would appreciate any environmental and natural resource information you have for the site. Enclosed is a map of the Matagorda TARS site for your use. In addition, if you have any comments/questions concerning potential environmental impacts, please provide your comments to me within 30 days of receipt of this letter. If you have any questions, please feel free to contact me at (830) 980-1830. Thank you for your assistance.

Sincerely,

Jackie Barwald

Jackie Baerwald
Environmental Scientist

1 Enclosure
Map of Matagorda TARS Site

ENVIRONMENTAL EXPRESS SERVICES, INC.
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EES

March 11, 2009

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P.O. Box 12276
Austin, TX 78711-2276

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We are in the data-gathering process for the preparation of the EA. We would appreciate any cultural resource information you may have for the site, especially the presence of any historic, prehistoric, or sensitive areas within the site. Enclosed is a map of the Matagorda TARS site for your use. In addition, if you have any comments/questions concerning potential environmental impacts, please provide your comments to me within 30 days of receipt of this letter. If you have any questions, please feel free to contact me at (830) 980-1830. Thank you for your assistance.

Sincerely,

Jackie Baerwald

Jackie Baerwald
Environmental Scientist

1 Enclosure
Map of Matagorda TARS Site

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March 11, 2009

Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087

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Sincerely,

Jackie Baerwald

Jackie Baerwald
Environmental Scientist

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Map of Matagorda TARS Site

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www.envexpress.com

EES

March 11, 2009

Texas Parks and Wildlife Department
4200 Smith School Road
Austin, TX 78711-3087

Dear Sir/Madam,

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March 11, 2009

U.S. Department of Agriculture
Natural Resources Conservation Service
Texas State Office
101 South Main
Temple, TX 76501

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Jackie Baerwald

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Environmental Scientist

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March 11, 2009

U.S. Fish and Wildlife Service
Southwest Regional Office
P.O. Box 1306
Albuquerque, NM 87103-1306

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Sincerely,

Jackie Baerwald

Jackie Baerwald
Environmental Scientist

1 Enclosure
Map of Matagorda TARS Site

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
101 South Main
Temple, TX 76501-7602

March 23, 2009

Ms. Jackie Baerwald
Environmental Scientist
Environmental Express Services, Inc.
5944 FM 1863
Bulverde, TX 78163

Dear Ms. Baerwald:

We have reviewed the project information and map pertaining to the demolition and restoration project at the Matagorda Tethered Aerostat Radar System (TARS) Site, Matagorda, Texas.

This project should have no significant adverse impact on the environment or natural resources in the area. We do not require any permits, easements, or approvals for activities such as this.

Thank you for the opportunity to review this proposed project.

Sincerely,

Donald W. Gohmert

DONALD W. GOHMERT
State Conservationist

Science Applications International Corporation
An Employee-Owned Company

27 June 2000

Mark Denton
Texas Historical Commission
P.O. Box 12276
Austin, TX 78711-2276

Dear Mr. Denton:

Science Applications International has been contracted to prepare an environmental assessment for a proposed action by the Air Force. This action would occur at the Matagorda Tethered Aerial Radar Site (TARS) about a mile and a half north of Matagorda TX. (The site is situated at 28 degrees 42 minutes 38 seconds N, -95 degrees 57 minutes 21 seconds W.) The site covers about 23 acres, measuring roughly 1000 feet by 1000 feet. An aerostat (blimp) borne radar system is based at this facility. This system is used to detect smuggling operations approaching the coast. The Matagorda site is one of a series of similar sites stretching along the southern coast of the US.

The Matagorda TARS site was established in the early 1990's. The Air Force is now considering closure of the site. Under the proposed action they would remove their equipment, and turn the site (including all facilities) over to the land owner from whom the site is being leased. This proposed action involves no earth disturbing activities.

Three alternatives are being considered. Under the "No Action" alternative the Air Force would continue to lease and operate the site in the same manner as it is currently operated. Under the second alternative, "Site Deactivation", activities at the site would cease, but the site would be maintained in such a way that it could be brought back "on-line' at some future date.

The third and final alternative being considered is "Site Restoration". Under this alternative the site would be closed and restored "as close as practical" to its original condition. This would include removal of the buildings and site infrastructure. It would also involve potential earth disturbance over a substantial portion of the site. It is expected that most of this disturbance would be superficial, involving only the top foot of soil. Most of the affected area would have been disturbed during site construction in the early 1990's. A substantial underground concrete and steel pier is present near the center of the site. This pier serves as an anchor point for the aerostat. It covers about 700 square feet. If the site restoration alternative were implemented, the top four feet of this pier

301 Laboratory Rd., P.O. Box 2501, Oak Ridge, TN 37831 (423) 482-9031 • Fax: (423) 482-6828

would be removed. This would be the most extensive activity involving earth disturbance at the Matagorda TARS site.

An "Archaeological Survey of the Matagorda Aerostat/Borne Radar Station Site In Matagorda County Texas" was conducted in 1990 by William E. Moore and H. Blaine Ensor (Principal Investigator). At the time of the survey the project area was described as a "cleared and abandoned rice field, with various weeds and grasses and occasional clumps of mesquite". The project area was examined by a 100% pedestrian survey with two persons following linear transects with intervals of 30 meters or less. Examination of the subsurface was carried out by shovel testing. (This included one shovel test to a depth of 20 cm).

According to Moore and Ensor (1990):

> A check of the files of the Texas Archaeological Research Laboratory revealed that no previously recorded sites exist in the project area, and examination of early maps at Texas A&M university showed no structures present. It is assumed that the site was used primarily for agricultural purposes and/or livestock. The project area is part of a grant awarded to Elias Robert Wightman in 1824 as part of Austin's first contract...The field survey failed to locate evidence of a prehistoric or historic site in the project area. Virtually the entire surface of the area surveyed exhibited evidence of past rice farming which has greatly disturbed the site surface. There are no areas that can be considered high probability in terms of prehistoric occupation. The nearest water source observed is the Colorado River, about one mile to the west, and no obvious landforms suitable for a prehistoric site exists in the project area. Also, the surface is mostly clay and clay loam, a soil type usually avoided by prehistoric groups.

Moore and Ensor concluded that"

> Due to the absence of an intact prehistoric or historic site in the project area, it is recommended that construction of the Matagorda Aerostat/Borne Radar Station be allowed to proceed. It is not considered necessary for an archeologist to monitor the construction phase of the project. However, if any cultural materials are discovered during construction, work must stop and the Texas Historical Commission notified immediately.

At this time we would like to determine if there is any further information of which we should be aware during the preparation of the Environmental Assessment for this project.

Your help is greatly appreciated

William M. Willis, PhD
Project Manager,
Science Applications International Corporation

NO [illegible] ECT
On National Register-eligible/listed properties
or State Archaeological Landmarks
PROJECT MAY PROCEED
by ____
for F. Lawerence Oaks
State Historic Preservation Officer
Date 7-13-06

ENVIRONMENTAL EXPRESS SERVICES, INC.
_5944 FM 1863_
Bulverde, Texas 78163
Telephone 830-980-1830 Fax 830-980-1831
www.envexpress.com

EES

March 11, 2009

Texas Historical Commission
P.O. Box 12276
Austin, TX 78711-2276

Dear Sir/Madam,

Environmental Express Services, Inc (EES) has been retained to prepare an Environmental Assessment (EA) for a proposed action by the Air Force. This action would occur at the Matagorda Tethered Aerostat Radar System (TARS) Site that is located approximately 1-1/2 miles northeast of Matagorda in Matagorda County, Texas. This site is located off Highway 60 at the following coordinates 28° 42' 38" North, 95° 57' 28" West. The TARS site encompasses approximately 23 acres configured in a 1,000-foot square.

The U.S. Air Force Air Combat Command assumes responsibility of the Matagorda TARS site. This site is one of a series of similar sites that stretch along the southern coast of the United States. The purpose of these systems is to detect smuggling operations approaching the coast. The Matagorda TARS site became active in 1994. In 2002, however, the site closed and was deactivated.

Under this proposed action, the Matagorda TARS site would be demolished and restored as close as possible to its original condition. This would include the removal of the buildings and site infrastructure. In addition, it would involve potential earth disturbance over a substantial portion of the site. The majority of the disturbance is expected to be relatively superficial, only involving approximately the top foot of soil. However, in the center of the site is a 700 square foot underground concrete and steel pier, which served as an anchor point for the aerostat. This consists of 12 individual piers that are 6 to 8 feet deep. In addition, beneath the Operations Building are 60 piers that are 2 feet in diameter and 12 feet in depth. Removal of these piers would be the most extensive activity involving earth disturbance that would occur at the Matagorda TARS site.

We are in the data-gathering process for the preparation of the EA. We would appreciate any cultural resource information you may have for the site, especially the presence of any historic, prehistoric, or sensitive areas within the site. Enclosed is a map of the Matagorda TARS site for your use. In addition, if you have any comments/questions concerning potential environmental impacts, please provide your comments to me within 30 days of receipt of this letter. If you have any questions, please feel free to contact me at (830) 980-1830. Thank you for your assistance.

Sincerely,

Jackie Baerwald

Jackie Baerwald
Environmental Scientist

1 Enclosure
Map of Matagorda TARS Site

NO HISTORIC
PROPERTIES AFFECTED
PROJECT MAY PROCEED
By ___
for F. Lawerence Oaks MAR 12 2009
State Historic Preservation Officer
Date 4/24/09
Track# ___

TEXAS PARKS & WILDLIFE

Life's better outside.™

April 15, 2009

Jackie Baerwald
Environmental Express Services, Inc.
5944 FM 1863
Bulverde, Texas 78163

RE: Matagorda Tethered Aerostat Radar System (TARS) Site, Matagorda County, Texas.

Dear Ms. Baerwald:

The Texas Parks and Wildlife Department (TPWD) has received your request for information regarding potential impacts to threatened and endangered species and for information on other issues of concern relating to the project referenced above. Under section 12.0011 of the Texas Parks and Wildlife Code, TPWD is charged with "providing recommendations that will protect fish and wildlife resources to local, state, and federal agencies that approve, permit, license, or construct developmental projects" and "providing information on fish and wildlife resources to any local, state, and federal agencies or private organizations that make decisions affecting those resources."

The Matagorda Tethered Aerostat Radar System (TARS) Site is located approximately 1.5 miles northeast of the City of Matagorda, Matagorda County, Texas. The U.S. Air Force Combat Command proposes to demolish and restore as close as possible to original conditions the existing site. Proposed activities include: the removal of the buildings and site infrastructure, the removal of a 700-square foot underground concrete and steel pier, and the removal of piers associated with the Operations Building.

Revegetation Plan

For revegetation, TPWD recommends selection of species that are suited to the site conditions, ecoregion, and intended uses and to consider native species that have multiple values and provide species diversity.

> Comment. TPWD prefers that disturbed areas be restored to pre-construction contours and planted with a mixture of **native** herbaceous species. Introduction of non-native species into native landscapes should be prevented. Native perennial grass species preferred by TPWD for permanent cover include Switchgrass (*Panicum virgatum*), Eastern Gamagrass (*Tripsacum dactyloides*), Virginia Wildrye (*Elymus virginicus*), Canada Wildrye (*E. canadensis*), Yellow Indiangrass (*Sorghastrum nutans*) and Little Bluestem (*Schizachyrium scoparium*). Other species appropriate for the area can be found by accessing the TPWD Texas Plant Information Database at http://tpid.tpwd.state.tx.us/overview.asp or by accessing the TPWD Wildscapes website at http://www.tpwd.state.tx.us/huntwild/wild/wildscapes/.

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.state.tx.us

> Comment. To verify successful revegetation and to determine the need for additional restoration, the applicant should conduct at least 2 years of post-construction monitoring.

> Recommendation. In wetlands, vegetation should be allowed to reestablish naturally, though a three year monitoring plan to determine success should be conducted. Unsuccessful revegetation would require active planting with native wetland herbaceous and woody plant species in consultation with a professional wetland ecologist.

Through experience, revegetation projects typically propose seed mixes that contain primarily bermuda grass (*Cynodon dactylon*) and/or bahiagrass (*Panium notatum*). Both of these grasses are non-native species that typically create a monoculture on the landscape and limit biodiversity.

Bahiagrass is considered undesirable from a wildlife perspective due to its invasive nature and lack of providing habitat for most wildlife. Once established, bahiagrasss can thrive with little water and fertilizer and produces an abundance of seed. In habitat restoration, herbicide treatment may remove bahiagrass for one season, though eradication of bahiagrass is very difficult because of the seed that remains in the soil and its aggressive rhizome system. Whereas, without applications of fertilizer and lime, bermuda grass tends to diminish and other herbaceous species are able to compete, thus biodiversity increases. Additionally, eradication of bermuda grass with herbicide is more feasible than eradication of bahiagrass.

> Comment. When the use of native seed mixes is not feasible, TPWD prefers the use of bermuda grass rather than bahiagrass for reasons mentioned above.

Rare and Protected Species

According to the Texas Natural Diversity Database (TXNDD) no known occurrences of threatened or endangered species have been recorded near (within 1.5 miles) of the proposed project.

The TXNDD is intended to assist users in avoiding harm to rare species or significant ecological features. Absence of information in an area does not imply that a species is absent from that area. Given the small proportion of public versus private land in Texas, the TXNDD does not include a representative inventory of rare resources in the state. Although it is based on the best data available to TPWD regarding rare species, *the data from the TXNDD do not provide a definitive statement as to the presence, absence or condition of special species, natural communities, or other significant features within your project area*. These data are not inclusive and **cannot be used as presence/absence data**. They represent species that could potentially be in your project area. This information cannot be substituted for on-the-ground surveys. The TXNDD is updated continuously; as your project progresses and for future projects, please contact Dorinda

Scott at (512) 389-8723 or txndd@tpwd.state.tx.us for the most current and accurate information.

Determining the actual presence of a species in a given area depends on many variables including daily and seasonal activity cycles, environmental activity cues, preferred habitat, transiency and population density (both wildlife and human). The absence of a species can be demonstrated only with great difficulty and then only with repeated negative observations, taking into account all the variable factors contributing to the lack of detectable presence. If encountered during construction, measures should be taken to avoid impacting wildlife.

> **Recommendation:** Please review the most current TPWD county lists for Matagorda County, as other rare species could be present depending upon habitat availability. These lists are now available on-line at http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species.phtml. If during construction, the project area is found to contain rare species, natural plant communities, or special features, TPWD recommends that precautions be taken to avoid impacts to them. The FWS should be contacted for additional species occurrence data, guidance, permitting, survey protocols, and mitigation for federally listed species. For the FWS rare species lists please visit http://www.fws.gov/southwest/es/EndangeredSpecies/lists/.

TPWD strives to respond to requests for project review within the 45 day comment period. Responses may be delayed due to workload and lack of staff. Failure to meet the 45 day review timeframe does not constitute concurrence from TPWD that the proposed project will not adversely impact fish and wildlife resources.

TPWD advises review and implementation of these recommendations. If you have any questions, please contact me at (361) 576-0022.

Sincerely,

Amy Hanna
Wildlife Habitat Assessment Program
Wildlife Division

/ajh:13888

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Ecological Services
17629 El Camino Real #211
Houston, Texas 77058-3051

December 2008

This responds to your request for threatened and endangered species information in the Clear Lake Ecological Services Field Office's area of responsibility. According to Section 7(a)(2) of the Endangered Species Act and the implementing regulations, it is the responsibility of each federal agency to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any federally listed species. Therefore, we are providing information to assist you in meeting your obligations under the Endangered Species Act.

A county by county listing of federally listed threatened and endangered species that occur within this office's work area can be found at http://www.fws.gov/southwest/es/EndangeredSpecies/lists/ListSpecies.cfm. You should use the county by county listing and other current species information to determine whether suitable habitat for a listed species is present at your project site. If suitable habitat is present, a qualified individual should conduct surveys to determine whether a listed species is present.

After completing a habitat evaluation and/or any necessary surveys, you should evaluate the project for potential effects to listed species and make one of the following determinations:

No effect – the proposed action will not affect federally listed species or critical habitat (i.e., suitable habitat for the species occurring in the project county is not present in or adjacent to the action area). No coordination or contact with the Service is necessary. However, if the project changes or additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.

Is not likely to adversely affect – the project may affect listed species and/or critical habitat; however, the effects are expected to be discountable, insignificant, or completely beneficial. Certain avoidance and minimization measures may need to be implemented in order to reach this level of effects. You should seek written concurrence from the Service that adverse effects have been eliminated. Be sure to include all of the information and documentation you used to reach your decision with your request for concurrence. The Service must have this documentation before issuing a concurrence.

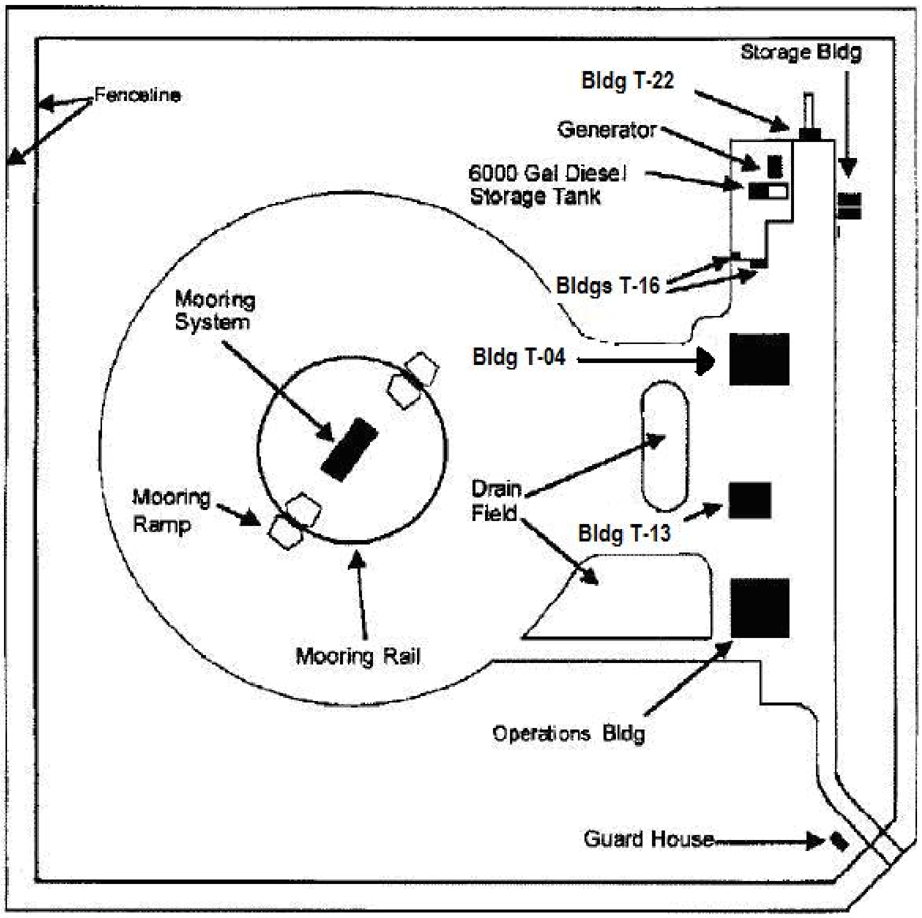
Is likely to adversely affect – adverse effects to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. If the overall effect of the proposed action is beneficial to the listed species but also is likely to cause some adverse effects to individuals of that species, then the proposed action "is likely to adversely affect" the listed species. An "is likely to adversely affect" determination requires formal Section 7 consultation with this office.

Regardless of your determination, the Service recommends that you maintain a complete record of the evaluation, including steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related articles.

TAKE PRIDE IN AMERICA

Appendix B
Site Photographs

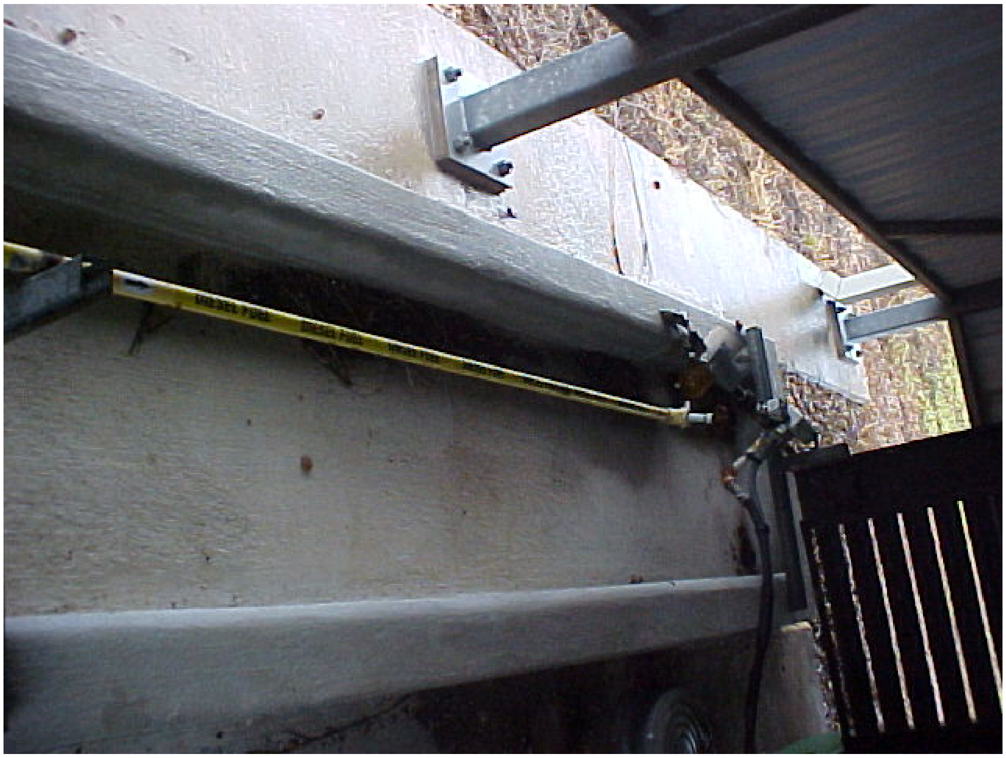
SITE PHOTOGRAPHS



Building T-04: Payload Service Building
Building T-13: Maintenance Garage Building
Building T-16: Hazardous Materials Storage Building
Building T-22: Water Tank and Pump Storage Buildings

Photograph 1: 5,700-gallon aboveground storage tank (AST) at Matagorda TARS site. This AST is located just north of the Payload Service Building.

Photograph 2: A fuel line from the AST goes into the adjacent shed where the generator is located.

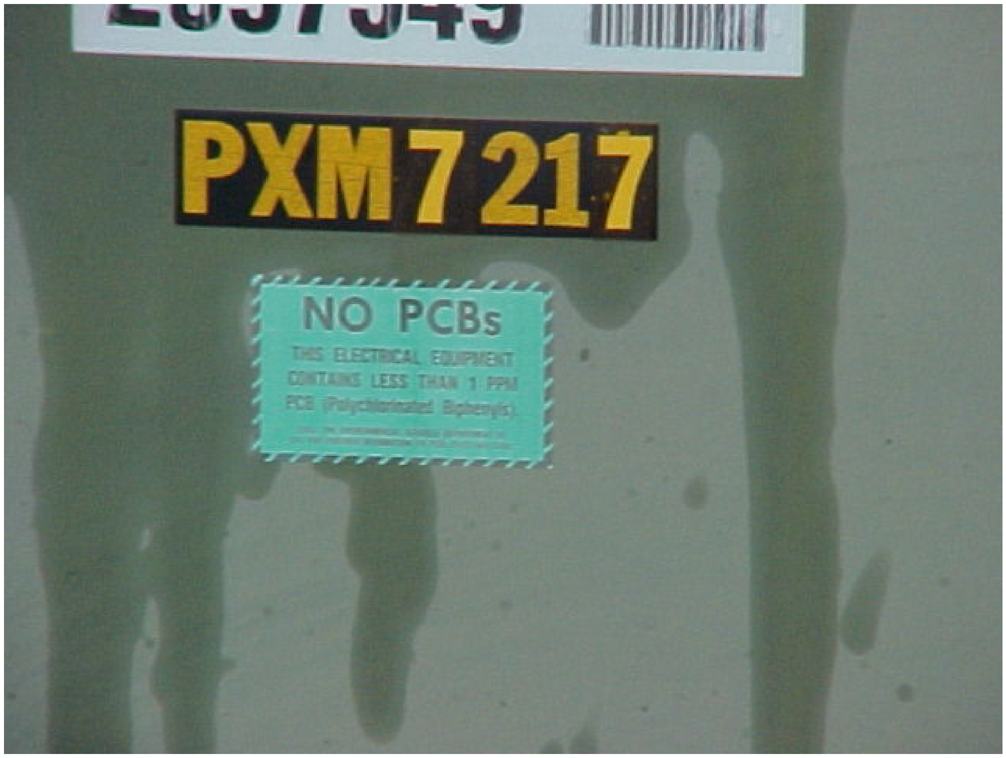


Photograph 3: Fuel line from the AST to the generator

Photograph 4: Lettering on the fuel line at the generator site.

Photograph 5: Generator in the shed. No leakage was observed.

Photograph 6: Transformers at the Matagorda TARS site.



Photograph 7: The transformers contain less than 1 ppm of PCBs.

Photograph 8: 20,000-gallon water tank at Matagorda TARS site. This water tank is located on the northern portion of the site directly north of the Water Tank and Pump Storage Building.

Photograph 9: The water tank is showing corrosion from the Gulf's salt water.

Photograph 10: Eastern view of the water tank with the water well shown in the background.

Photograph 11: Onsite water well with a depth of 685 feet. This well is located in the northeast corner of the site and produces water at 60 gallons per minute (gpm).

Photograph 12: Building T-22—Water Tank and Pump Storage Building

Photograph 13: Western view of Building T-22.


Photograph 14: Building T-16—Hazardous Materials Storage Building

Photograph 15: Western view of Building T-16.

Photograph 16: Building T-04—Payload Service Building

Photograph 17: Trash and debris next to Building T-04.

Photograph 18: Inside Building T-04—stored equipment such as these lights. There was no electricity at any of the buildings except at the Guard House at the entrance.

Photograph 19: Storage cabinet found in Building T-13—Maintenance Garage Building showing insecticide and a bottle of air tool cleaning oil.

Photograph 20: Additional items stored in the bottom shelf of the yellow cabinet found in the Building T-13.


Photograph 21: Equipment in Building T-13


Photograph 22: Compressed oxygen tank and dissolved acetylene tank found in Building T-13.

Photograph 23: Acetylene tank in Building T-13.

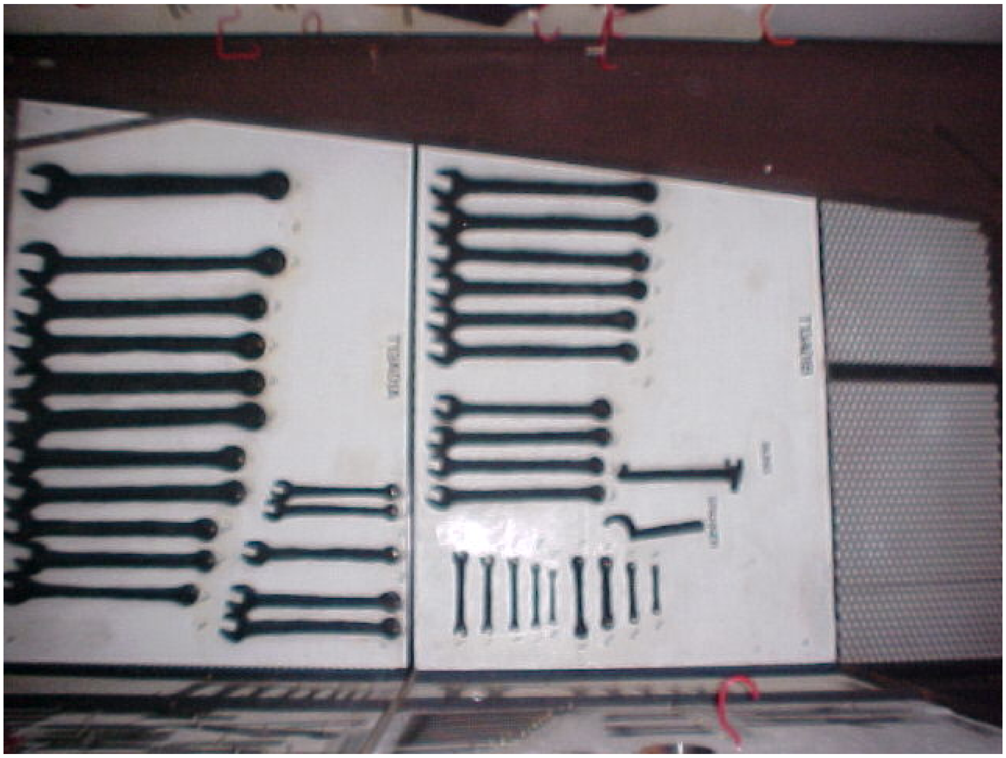
Photograph 24: Oxygen tank in Building T-13.

Photograph 25: Clean rags, fire extinguisher, jacks, and other equipment in Building T-13.

Photograph 26: Batteries stored in Building T-13.

Photograph 27: Eye Wash Station in Building T-13

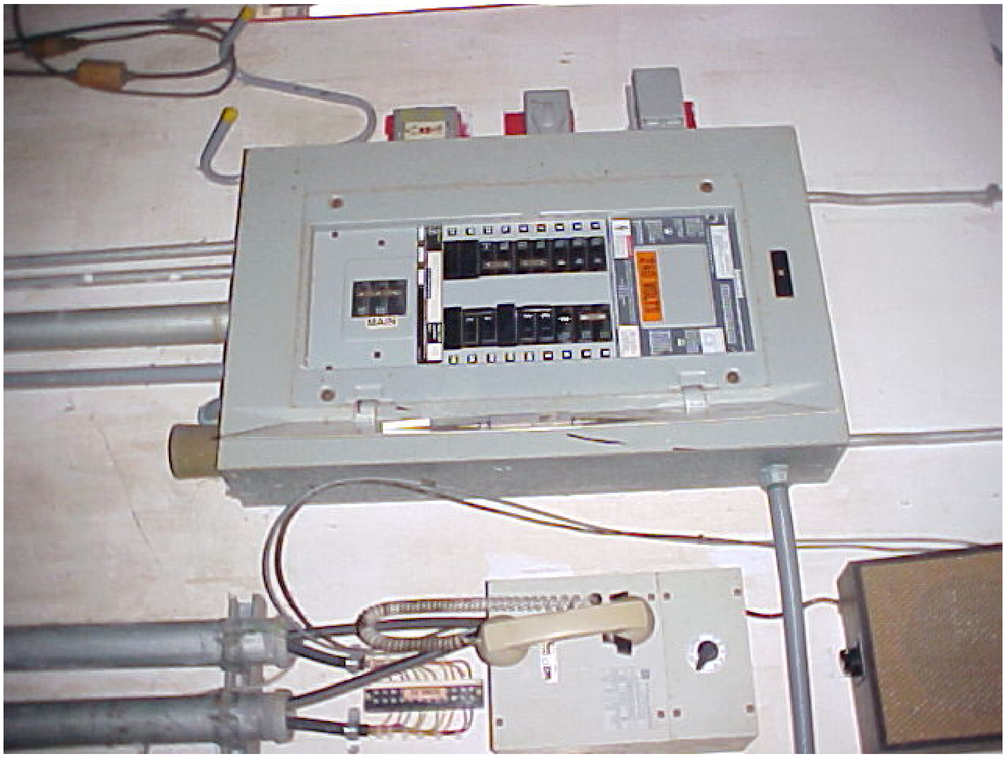

Photograph 28: Empty gasoline tanks and rubber hosing in Building T-13.


Photograph 29: Tools (new or unused) hanging on the walls in Building T-13.

Photograph 30: Air pump found in Building T-13.

Photograph 31: Empty 6-gallon drums used for storing soiled rags in Building T-13.

Photograph 32: Riding mower and other equipment (ladders, chairs, tools) in Building T-13.



Photograph 33: Circuit breaker and telephone on wall in Building T-13.

Photograph 34: Operations Building

Photograph 35: Operations Building with the septic drainage field behind it.

Photograph 36: View looking southeast showing the Operations Building.

Photograph 37: Operations Building – desks, computers, and other equipment stacked up.

Photograph 38: Operations Building—circuit breaker and other electrical boxes and equipment.

Photograph 39: Logistics Room within the Operations Building, minus the computers.

Photograph 40: Break room, furniture, and refrigerators left behind in Operations Building.

Photograph 41: First aid supplies found in Operations Building.

Photograph 42: Circuit box inside the Operations Building.

Photograph 43: Bags of trash (trash consisted of paper items like old files and manuals) found throughout Operations Building.

Photograph 44: An office with empty desks and cabinets in the Operations Building.

Photograph 45: Empty lockers in the Operations Building.

Photograph 46: Manuals, Technical Orders, Operations Guidebooks, etc. stacked on the floor in Operations Building.

Photograph 47: Office with empty desks in Operations Building.

Photograph 48: Kitchen cleaning materials such as Clorox, dishwashing liquid, etc. found in Operations Building.

Photograph 49: Concrete pad with nothing on it.

Photograph 50: The Aerostat pad and equipment at Matagorda TARS site.

Photograph 51: View facing southeast showing the Aerostat facility.

Photograph 52: Storage container with wood pallets stacked beside it.

Photograph 53: View looking south of the facility.

Photograph 54: View looking south, showing the septic tank drainage field (green grassed area), and the Guard House at the entrance

Photograph 55: View looking southeast of the site. It was raining during the site investigation.

Photograph 56: a 6-foot chain link fence, topped with three lines of barbed wire, encloses the TARS site. The terrain is flat and outside the TARS site, it is heavily vegetated with mesquite, cedar, and elm trees, and other vegetation.

Appendix C
Hazardous Materials Inventory

MATAGORDA TARS SITE
MSDS LIST

ALPHABETICAL 05/30/2001

MSDS #	DESCRIPTION	PART #	MANUFACTURER	HMIS CODE H F R	PE	BK #
2	A/C PURGE & FLUSH	1011116	CHEM WAY	2 2 0	H	1
136	ABC DRY CHEM. EXTINGUISHER		W. KIDDE PORT. EQUIP. CO.	1 0 0	H	3
14	ACETONE	154-8775	SHERWIN-WILLIAMS	1 3 0	G	1
112	AERODUSTER	MS-222N	MILLER-STEPHENSON	1 0 0	B	3
47	AIR TOOL OIL		MARVEL OIL CO.	1 2 0	D	1
108	ALL PORPOSE CLEANER	409	CLOROX	1 0 0	A	2
27	ALODINE	1201	HENKEL SURFACE TECH.	3 0 0	F	1
139	ANTI SIEZE LUBRICANT	80208	PERMATEX IND. CORP	1 1 0	B	3
32	ANTI STATIC FLUID	8R90275	XEROX	1 0 0	A	1
21	ANTIFREEZE	CC2701	FLEETGUARD INC.	2 0 0	B	1
6	AQUA ZYME	AZ-1000	AQUA ZYME INC.	1 0 0	B	1
99	ARGON	3A2015	L & V INDUSTRIAL SUPPLY	2 0 0	N/A	2
60	ARMOR ALL PROTECTANT		ARMOR ALL PRODUCTS	1 0 0	A	2
46	BAKING SODA		ARM & HAMMER	1 0 0	A	1
52	BEARING GREASE	SL-3161	STAY-LUB	1 0 0	B	1
164	BONDO GLASS	272	DYNATRON/BONDO CORP.	2 3 0	E	3
116	BORAXO SOAP POWDER		DIAL CORP.	1 0 0	A	3
104	BRAKE FLUID	DOT3	CAR QUEST	3 1 0	B	2
78	BRAZING ALLOY	25004	BOWMAN DIST.	1 0 0	A	2
137	BUFFERED EYE WASH	1181	LAB SAFETY SUPPLY INC.	1 0 0	N/A	3
72	CAR WASH	T-78	TURTLE WAX	1 0 0	A	2
64	CATALYST EPOXY PRIMER	MP175	PPG INDUSTRIES	3 3 0	H	2
117	CITRUS HAND CLEANER		VALVOLINE OIL CO.	0 2 0	A	3
84	CLEAN UP W/BLEACH		CLOROX	1 0 0	A	2
150	CLEAR SEALANT	732	DOW CORNING	1 0 0	B	3
42	COLD GALVANIZING COMPOUND		RUSTOLEUM	2 4 0	H	1
98	COMPRESSED AIR	3AA2265		1 0 0	N/A	2
8	COOLANT ADDITIVE	3P2044	CATERPILLAR	1 0 0	D	1
30	CORROSION X	TYPE 2	CORROSION TECH.	1 1 0	D	1
1	CUTTING FLUID	10742	HOUGEN MFG.	2 0 0	B	1
89	DEEP WOODS OFF		JOHNSON WAX	1 3 0	A	2
38	DELSTAR ACRYLIC ENAMEL	DAR 9000	PPG INDUSTRIES	2 3 0	G	1
58	DELSTAR ACRYLIC ENAMEL	DAR 8000	PPG INDUSTRIES	2 3 0	H	2
33	DENATURED ALCOHOL		HOME OIL CO. INC.	3 4 0	H	1
17	DIESEL CONDITIONER	6A	SILOO	2 2 0	B	1
19	DIESEL CONDITIONER	6B	SILOO	2 2 0	B	1
124	DIESEL FUEL		CHEVRON	3 2 0	B	3
36	DISH DETERGENT		CHEM TECH	2 0 0	A	1
101	DISPERSION	236	DOW CORNING	4 4 0	H	2
37	DTR REDUCER	DTR 600	PPG INDUSTRIES	3 4 0	H	1
39	DXR HARDENER	DXR 80	PPG INDUSTRIES	3 4 0	H	1
80	ELECTRICAL INSULATING PASTE	DC-4	DOW CORNING	1 2 0	B	2
158	ELMERS WOOD FILLER		BORDEN INC.	1 0 0	A	3
5	EN STAT	MS-966/CO2	MILLER-STEPHENSON	2 1 1	B	1
22	ENVIROSORB		LAB SAFETY SUPPLY INC.	1 0 0	B	1
105	ETERNACELL LiS02 BATTERY	89753	POWER CONVERSION INC.	1 1 0	A	2
160	EXPO DRY ERASE CLEANER		SANFORD CORP.	1 2 0	B	3
169	FINALE HERBICIDE		AGREVO USA	2 1 0	F	3
66	FISHEYE ELIMINATOR	MX194	PPG INDUSTRIES	2 3 0	H	2
9	FLEET COOL	40DCA2	FLEETGUARD INC.	1 0 0	B	1

MATAGORDA TARS SITE
MSDS LIST

ALPHABETICAL 05/30/2001

MSDS #	DESCRIPTION	PART #	MANUFACTURER	HMIS CODE H F R	PE	BK #
155	FLOURESCENT BULB	F40CW	OSRAM SYLVANIA INC.	1 0 0	A	3
94	FLYING INSECT KILLER		RAID	0 4 0	N/A	2
73	FREEZE-IT 2000		CHEMTRONICS INC.	1 0 0	B	2
121	GAS MIXTURE		AIR LIQUIDE	3 0 0	B	3
127	GEAR OIL	80W-90	LUBRICATING SPECIALTIES	1 1 0	B	3
163	GEAR OIL 80-90	4096	PENNZOIL CO.	1 1 0	B	3
100	GLUE	UR-1087	CLIFTON ADHESIVE	4 4 1	H	2
85	GOJO HAND CLEANER		GOJO INDUSTRIES	1 0 0	A	2
44	GREASE	GR-22	SHELL OIL CO.	1 0 0	B	1
71	GREAT VALUE HOME ULTRA BLEACH	538858764	KIK INTERNATIONAL	2 0 0	A	2
48	GUNK DEGREASER	SC-XX	RADIATOR SPECIALTY CO.	2 2 0	D	1
95	HARDENER	MH-101	PPG INDUSTRIES	3 2 1	G	2
92	HELIUM GAS (COMPRESSED)	DOT3AL	MG INDUSTRIES	1 0 0	N/A	2
93	HELIUM MIL V 2/26 CYL.	3AA240DC	TRI-GAS	1 0 0	N/A	2
53	HIGH TEMP GREASE	5438-8	CATO OIL CORP.	2 0 0	B	1
156	HOST SPOT REMOVER		RACINE INDUSTRIES	1 2 0	A	3
140	HUMIDITY STANDARD	62520	ROTRONIC INST CORP.	2 0 0	C	3
120	JOMAX		ZEHRUNG CORP	1 0 0	A	3
102	KITCHEN MATE	P-D-410	LHB INDUSTRIES	1 0 0	A	2
57	LAB-METAL		ALVIN PRODUCTS	1 3 0	G	2
59	LAB-SOLVENT		ALVIN PRODUCTS	1 3 0	G	2
7	LAQUER THINNER	154-8791	SHERWIN-WILLIAMS	2 3 0	G	1
40	LIBERTY GEAR LUBE	SAE 140	INDUSTRIAL LUBE CO.	2 0 0	B	1
159	LUBRIPLATE CHAIN & CABLE		FISKE BROS. REFINISHING	2 4 0	G	3
55	LYSOL ANTIBACTERIAL SPRAY		L & F PRODUCTS	1 0 0	B	2
146	MANGANESE DIOXIDE DISPERSION	PR1440-A2	COURTAULDS AEROSPACE	2 1 0	G	3
15	MEDIUM REDUCER	MR-186	PPG INDUSTRIES	2 3 0	G	1
16	MEK WIPES	SW250073	CONTEC	2 4 0	G	1
128	METHYL ETHYL KETONE		SHERWIN-WILLIAMS	2 4 0	G	3
24	MINERAL SPIRITS		STARTEX	2 2 0	B	1
62	MISTY SOLVENT	R-925	AMREP INC.	2 0 0	B	2
106	MURATIC / HYDROCHLORIC ACID	160-0507	STARTEX	2 0 0	C	2
103	NAVAL JELLY	80278	LOCTITE CORP.	3 0 0	B	2
83	NICKLE PRINT	22-207	GC ELECTRONICS	2 3 1	B	2
91	NITROGEN	3AA2015	AIR PRODUCTS & CHEM.	1 0 0	N/A	2
97	NITROGEN	3AA2400C	AIR PRODUCTS & CHEM.	2 0 0	N/A	2
76	O RING LUBRICANT	55ORING	DOW CORNING	1 1 0	B	2
13	OIL, 2 CYCLE		ECHO (CITGO)	1 2 0	B	1
170	ORTHENE FIRE ANT KILLER		SOLARIS GROUP	2 1 0	A	3
65	OSPHO METAL TREATMENT		SKYBRYTE CO.	1 0 0	B	2
25	OZZY JUICE	SW1-3	CHEMFREE	1 0 0	B	1
63	PAINT ACRYLIC ENAMEL (60550)	MAE-2	PPG INDUSTRIES	2 3 1	H	2
61	PAINT ACRYLIC ENAMEL (8000/9000)	MAE-1	PPG INDUSTRIES	2 3 1	H	2
43	PAINT ALUMINUM	7715	RUSTOLEUM	2 2 0	H	1
67	PAINT EPOXY PRIMER	MP170	PPG INDUSTRIES	2 3 0	H	2
153	PAINT FLAT BLACK	7776	RUSTOLEUM	2 4 0	G	3
110	PAINT GLOSS BLACK	7779	RUSTOLEUM	2 2 1	G	2
148	PAINT GLOSS RED	7765	RUSTOLEUM	2 2 1	G	3
82	PAINT GLOSS WHITE	7792	RUSTOLEUM	2 3 0	H	2
149	PAINT LATEX EGG SHELL	B20W201	SHERWIN-WILLIAMS	2 1 0	E	3

MATAGORDA TARS SITE
MSDS LIST

ALPHABETICAL 05/30/2001

MSDS #	DESCRIPTION	PART #	MANUFACTURER	HMIS CODE H F R PE	BK #
147	PAINT LATEX FLAT WHITE	A80W506	SHERWIN-WILLIAMS	2 1 1 E	3
152	PAINT LEATHER BROWN	7775	RUSTOLEUM	2 4 0 G	3
161	PAINT SMOKE GRAY	7786	RUSTOLEUM	2 4 0 G	3
114	PAINT THINNER	HET 1545	GROW AUTOMOTIVE	2 4 0 G	3
28	PAINTER'S CAULK	18065	DAP INC.	3 0 0 B	1
122	PEN OILER		GC THORSEN	1 1 0 A	3
34	PENETRATING OIL	WD-40	WD-40 CO.	2 2 0 B	1
18	PLASTIC ROOF CEMENT	6223	GIBSON HOMANS	2 2 0 B	1
31	PLATEN GLASS CLEANER	43P81	XEROX	1 3 0 B	1
51	PLEDGE W/VANILLA		SC JOHNSON & SON	1 4 0 A	1
45	PREDILUTED ENGINE COOLANT	16334	CATERPILLAR	2 1 0 B	1
86	RANDO OIL	HD-68	TEXACO OIL CO.	1 1 0 B	2
144	REAL KILL WASP & HORNET		CHEMISCO	2 2 0 B	3
125	RED X CORONA DOPE	10 5012	GC THORSEN	2 4 0 B	3
12	RELEASE AGENT	MS-143N	MILLER-STEPHENSON	3 0 0 H	1
145	REPEL		WISCONSIN PHARMACAL	1 2 0 B	3
54	ROTELLA OIL (15W-40)	50012	SHELL OIL CO.	2 0 0 B	2
162	RUG & UPHOLSTERY CLEANER		LHB INDUSTRIES	1 0 0 B	3
4	RUST INHIBITOR	DCA 65L	FLEETGUARD INC.	0 0 0 B	1
29	RUST INHIBITOR HEAVY DUTY	LPS 3	LPS LABORATORIES	1 2 0 B	1
69	RUSTY METAL PRIMER	7769	RUSTOLEUM	2 3 0 H	2
88	SAFETY SOLVENT 140	721938	INDUSTRIAL LUBE CO.	1 2 0 B	2
113	SAFEZONE CLEANER	MS-260	MILLER-STEPHENSON	1 2 0 B	3
87	SAFEZONE CLEANING SOLVENT	MS-941/CO2	MILLER-STEPHENSON	1 0 0 B	2
79	SCOTCHKOTE	14853	3M	2 3 0 B	2
35	SEALANT GEOCEL 3300	90215-03	GEOCOR	2 2 0 B	1
74	SEM KIT	655	ELECTROCATALYTIC INC.	3 1 0 C	2
3	SILICONE	RTV 3110	DOW CORNING	0 0 0 B	1
111	SILICONE	RTV 162	GE SILICONES	1 1 0 B	3
165	SILICONE	GE 5000	GE SILICONES	1 0 0 B	3
49	SILICONE DRY LUBE	557	DOW CORNING	1 2 0 B	1
151	SILICONE GASKET (BLUE)	81724	PERMATEX IND. CORP	1 1 0 B	3
168	SILICONE LATEX CAULK	1100A	SHERWIN-WILLIAMS	1 0 0 B	3
77	SILICONE LUBRICANT	TYPE Z9	GC ELECTRONICS	1 0 0 B	2
26	SIMPLE GREEN	1Z575	SUNSHINE MAKERS	1 0 0 B	1
50	STRYPEEZE		SAVOGRAN	2 3 0 H	1
96	SULFUR HEXAFLORIDE	SF6	ALLIED CHEMICAL CORP.	1 0 0 N/A	2
119	SUPER SOAP		SOFTSOAP ENTERPRISES	0 0 0 C	3
81	SUPER STRIP		SAVOGRAN	2 1 0 B	2
129	TDH OIL		EQUILON ENTERPRISES	1 1 0 B	3
90	TELLUS HYDRAULIC OIL	68	SHELL OIL CO.	1 1 0 B	2
10	THOMPSON'S WATER SEAL		THOMPSON & FORMBY	2 3 0 H	1
75	THREAD LOCKER (RED)	271	LOCTITE CORP.	1 1 1 B	2
20	TONER CARTRIDGE		XEROX	1 3 0 B	1
56	TOUCH UP PAINT (BLUE)	12345993	GMC		2
23	TRAFFIC PAINT YELLOW	B29-Y2	SHERWIN-WILLIAMS	1 4 0 B	1
11	TRANSMISSION FLUID	2544	SPECIALTY OIL CO.	1 0 0 A	1
41	TRANSMISSION FLUID	349	VALVOLINE OIL CO.	2 0 0 B	1
133	ULTRA IVORY LIQUID		PROCTOR & GAMBLE	1 2 0 A	3
138	UR-1087 ACCELERATOR		CLIFTON ADHESIVE	3 3 0 H	3

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MSDS #	DESCRIPTION	PART #	MANUFACTURER	HMIS CODE H F R PE	BK #
157	WALLBOARD & JOINT COMP.		DAP INC.	1 0 0 B	3
131	WAL-MART SPRAY PAINT	21000 SERIES	UNITED COATINGS	2 2 0 G	3
154	WAX STICK		ASHBURN INDUSTRIES	1 0 0 A	3
167	WELD-ON CEMENT	790	IPS CORP.	2 4 0 B	3
166	WELD-ON PRIMER	P70	IPS CORP.	1 4 0 B	3
123	WINDEX (BLUE)		SC JOHNSON & SON	1 2 0 N/A	3
70	WINDSHIELD WASHER FLUID	52110-50625	TECH 2000 (WAL-MART)	1 2 0 A	2
68	ZRC COLD GALVANIZING COMP		ZRC WORLDWIDE	2 2 1 H	2
107					2
109					2
115					3
118					3
126					3
130					3
132					3
134					3
135					3
141					3
142					3
143					3

Appendix D
Lead-Based Paint Report from Another Project

ERDC/CERL TR-07-2

Construction Engineering
Research Laboratory

US Army Corps
of Engineers®
Engineer Research and
Development Center

LBP Concerns in Producing Recycled Concrete Aggregate from Former Fort Ord Family Housing

Stephen D. Cosper

January 2007

ERDC/CERL TR-07-2
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LBP Concerns in Producing Recycled Concrete Aggregate from Former Fort Ord Family Housing

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Final report

Approved for public release; distribution is unlimited.

Prepared for U.S. Army Corps of Engineers
Washington, DC 20314-1000

Abstract: The presence of lead-based paint on concrete from demolition projects raises questions regarding suitable reuse or disposal. The regulatory environment is unclear on issues of reuse. This report attempts to correlate the concentration of lead on a painted building to the concentration of lead in aggregate produced from that building's demolition. This final concentration is the key metric in determining suitable end use. In this case of former Army family housing, the final lead concentration was found to be quite low.

(Cover photograph: Discharge conveyor from Kroeker concrete crushing plant, with Confidential Compliance Consultants sampling technician in foreground.)

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Preface

This study was conducted under the applied research program (6.2) in the solid waste program. A portion of this study was funded by the Construction Materials Recycling Association and the National Demolition Association. The technical monitor was Malcolm McLeod, Headquarters, U.S. Army Corps of Engineers.

The work was performed by the Environmental Processes Branch (CN-E) of the Installations Division (CN), Construction Engineering Research Laboratory (CERL). The CERL Principal Investigator was Stephen D. Cosper. Dr. Stephen W. Maloney is Acting Chief, CN-E, and Dr. John T. Bandy is Chief, CN. The Technical Director for the Environmental Quality/Installations business area is Martin J. Savoie. The Deputy Director of CERL is Dr. Kirankumar V. Topudurti, and the Director is Dr. Ilker Adiguzel.

The author would like to acknowledge the following for their contributions to the project and the contents of this report: Stan Cook, Fort Ord Reuse Authority; Kathleen Herzog, University of Illinois, Urbana-Champaign; Jeff Kroeker, Kroeker, Inc.; Alexis Rivera-Montalvo, University of Puerto Rico–Mayagüez; Mike Taylor, National Demolition Association; George Thomas, Confidential Compliance Consultants; and William Turley, Construction Materials Recycling Association.

CERL is an element of the U.S. Army Engineer Research and Development Center (ERDC), U.S. Army Corps of Engineers. The Commander and Executive Director of ERDC is COL Richard B. Jenkins, and the Director of ERDC is Dr. James R. Houston.

Unit Conversion Factors

Multiply	By	To Obtain
feet	0.3048	meters
mils	0.0254	millimeters
square feet	0.09290304	square meters

1 Introduction

Background

Environmental lead (Pb) comes from many sources and takes many pathways to human exposure. Pb has a myriad industrial uses, many of which have been curtailed due to human health and environmental risk. A lingering Pb-related concern is Pb from lead carbonate (PbCO3) paints used in wood and concrete buildings throughout most of the 20th century. When these buildings are still occupied, Pb exposure from the lead-based paints (LBP) is of particular concern as Pb interferes with neurological development. An entire regulatory regime, testing criteria, and abatement techniques have been developed to address the dangers of LBP in occupied housing.

When the building is no longer occupied and is ready for demolition, however, the presence of LBP becomes a question of worker safety and environmental protection. Occupational Safety and Health Administration (OSHA) regulations deal with worker protection; provisions in the Resource Conservation and Recovery Act (RCRA) deal with the disposal of Pb-containing wastes.

What if the project manager does not want to "dispose of" the Pb-containing demolition wastes? How to handle such waste has been a regulatory gray area for many years. CERL researchers have attempted to quantify Pb mass and concentrations from several demolition projects to help determine relative hazard, and to try to assess which environmental laws are applicable. Recycling and reuse of materials with LBP is of special interest because they are so pervasive in older Army building stock, much of which the Army is replacing.

Objective

The purpose of this study was to track the location and concentration of LBP through the demolition of a set of typical concrete Army buildings; and the subsequent crushing of the concrete for reuse. The project took place at Fort Ord, CA, which was closed under Base Realignment and Closure (BRAC) in 1991.

Paint Chemistry

Paint pigments are solid, uniform particles that are permanently insoluble in the paint (Gooch 1993). The main purposes of a pigment are to give color and opacity to the paint. White pigments are specially important because they provide the opacity (ability to hide what is under the paint), and a basis for other colors. PbCO3 was a very common white pigment in the mid-20th century. Its use was phased out as health and environmental problems became evident, and as other pigments were developed. Today, titanium dioxide is very prevalent.

Another potential source of Pb in paint are organic Pb compounds used as “driers” in paint. Driers are chemical paint additives that hasten drying. They pull oxygen through the wet paint film to oxidize and cure the paint. These driers include lead naphthenate, lead resinates, and lead linoleates (Gooch 1993). One of CERL’s research partners is currently attempting to speciate Pb contamination found inside wood from a WWII-era Army building.

Regulation

Multiple federal agencies regulate Pb depending on the exact location and circumstance.

The U.S. Consumer Product Safety Commission (<http://www.cpsc.gov>) has banned the sale of LBP to consumers. The agency now limits the Pb concentration to 0.06 percent (600 ppm) in paints or painted items if they will be sold to the general public.

The U.S. Department of Housing and Urban Development and the U.S. Environmental Protection Agency (USEPA) jointly control household Pb exposure. The limit for Pb in soil is 400 ppm for bare surface soil in residential areas where child contact is likely. This limit increases to 1,200 ppm for areas with minimal potential for child contact.

Pb dust is a primary route of exposure in housing. The dust is generated from paint deterioration, renovations, or friction surfaces such as door jambs. The hazard limits for Pb in dust is 40 $\mu g/ft^2$ for floors, 250 $\mu g/ft^2$ for window sills, and 400 $\mu g/ft^2$ for window troughs. These levels are also used to determine where Pb abatement has been conducted.

OSHA regulates worker exposure to Pb dust (<http://www.osha.gov/SLTC/constructionlead/index.html>). The two numeric limits are both applicable over an 8-hr workday. The action level is 30 $\mu g/m^3$. The "action level" means employee exposure, without regard to the use of respirators. The permissible exposure limit (PEL) is 50 $\mu g/m^3$. No employee should be exposed to Pb over the PEL, calculated as an 8-hr time weighted average. Different levels for monitoring and worker protection are engaged when crossing these limits.

Under RCRA, a waste is considered hazardous if it contains more than 5 ppm Pb (throughout the entire bulk of the material) per the toxicity characteristic leaching procedure (TCLP). Note that RCRA governs the disposition of a material only if it is a "waste" and will not be reused. The following USEPA web site is a good place to review Federal Pb regulations and programs: <http://www.epa.gov/lead/index.html>.

Because this project took place in California, environmental regulations for that state are also of interest. A material is considered a California hazardous waste if the total Pb content is above 1,000 ppm.

Project description

Local governments have been redeveloping the former Fort Ord property for a variety of purposes, including "affordable" housing in a region with very high housing costs. One hundred acres of family housing were cleared in 2003. See the website of the Fort Ord Reuse Authority (FORA): <http://www.fora.org>.

As part of the reuse and redevelopment of the Fort Ord property, Kauffman & Broad Homes is building new homes on the site of the Hayes Park family housing area. Kauffman retained Kroeker, Inc. of Fresno, CA (<http://www.kroekerinc.com/>) to demolish 367 family housing units. The contract detailed specific requirements for dismantling all reusable or recyclable construction materials prior to structural demolition. Part of this pre-demolition work included the abatement of asbestos and LBP. Both of these materials are considered California Hazardous Wastes and must be disposed under strict regulatory controls, including full manifesting. These single and duplex homes were concrete block structures with stucco finish on slab foundations. After demolition, Kroeker was to crush the resultant concrete rubble (an estimated 70,000 tons) to be used later as fill, road base, etc., for other redevelopment work.

Kroeker used an Eagle Crusher, Model CV 1400; an Eagle triple deck screen, Model 65D006; and associated conveyors. Go to the Eagle website http://www.eaglecruser.com/?articleid=73 for an article with more specifics. Figure 1 shows the crusher plant in operation.

The goal of this study was to try to identify and quantify the disposition of LBP from the buildings through the entire process of demolition and crushing with the following steps:

- Measure Pb content on three study buildings at Hayes Park
- Monitor air emissions during demolition
- Monitor air emissions during crushing
- Sample soil near buildings and at crusher site
- Measure Pb concentration of crushed concrete product
- Compare predicted Pb concentration (based on building samples) to Pb concentration observed in crushed concrete product
- Draw conclusions on fate of LBP.

Figure 1. Overview of crusher plant.

Approach

The U.S. Army Engineer Research and Development Center's Construction Engineering Research Laboratory (CERL), in cooperation with the Construction Materials Recycling Association (CMRA, Eola, IL, <http://www.cdrecycling.org>) and the National Demolition Association (NDA, Doylestown, PA, <http://www.demolitionassociation.com/>) retained Confidential Compliance Consultants (CCC, Altadena, CA,

<http://www.confidentialcompliance.com/>) to assist with the sampling work. Prior to the execution of this study, all asbestos and LBP were reportedly abated. Structural demolition of the concrete structures remaining was well underway prior to sampling. Most of the interior walls were concrete and covered with a paint containing both Pb and asbestos. This paint was abated prior to demolition. The abatement activity was driven by the asbestos content.

Three sample structures were chosen to study their LBP content. They were some of the last units to be demolished under the redevelopment project, and had already been stripped down to concrete walls. Two of these were duplex family housing units. The addresses were 223, 225-227, and 226-228 Napier Street. Figure 2 shows a map of the Hayes Park neighborhood. The numbers on the map are the Army real property building numbers. This report uses the common street addresses. Figure 3 shows a typical building in this neighborhood.

Figure 2. Hayes Park Army family housing.

Figure 3. Typical family housing unit.

2 Sampling Results

Interior wipe samples

Three of the Hayes Park buildings were selected as research structures. They were out of the way of the active demolition work, and they were among the last to be removed.

CCC took floor wipes at the three buildings. Table 1 shows the results. The results shown were the analytical results of composite wipe samples, where each structure had four single wipe samples submitted as a single composite sample.

Table 1. Interior floor dust wipe samples.

Building Number	Pb conc. (μg/ft^2)
223	1,957
225/227	356
226	179

Although these structures were not intended to be cleaned for Pb abatement clearance, one can compare the numbers in Table 1 to the HUD limit of 40 μg/ft^2 for interior floors. The presence of Pb in dust on the floor is not surprising considering the LBP found in the existing paint films within these structures. The most significant concern from this dust would be worker exposure. Prior to mechanical demolition of the buildings, workers stripped out doors, fixtures, wood partitions, etc., until only the concrete walls remained.

Crusher site wipe samples

The crusher site consisted of a large fenced staging area with an entrance for trucks, bringing concrete from the demolition site. A second gate allowed the trucks to exit without the need for backing into traffic.

An area was designated as the supply dump site. Here, after trucks dumped their loads, a front-end loader or a track-mounted excavator would load the rubble into the crusher's receiving hopper. A water tanker onsite supplied a much needed stream of dust control spray. The concrete rubble was crushed, screened, and stacked in large piles. Table 2 lists re-

sults of Pb wipe samples at the crusher site. Figure 4 shows a CCC staff member taking a wipe sample from a truck at the crusher site.

Table 2. Wipe samples at the crusher site.

Location	Pb conc. (µg/ft²)
Crusher - left front	43
Crusher - left rear	<20
Crusher - right front	388
Crusher - right rear	64
Excavator – bucket	71
Excavator - left front	<20
Excavator - left rear	<20
Excavator - right front	23
Excavator - right rear	<20
Loader – bucket	<20
Loader - Left front tire	105
Loader - right side	81
Truck - left front	67
Truck - left rear	<20
Truck - right front	293
Truck - right rear	<20
Worker – gloves	46
Worker - hard hat	<20
Worker - left boot	<20
Worker - right boot	33

Figure 4. Dust wipe sampling.

The results show that the Pb dust levels are not altogether risky for workers in the immediate area. The amount of airborne dust is generally likely to pose a greater hazard than the small Pb content of the dust. A dust control spray system was used and worked well.

Soil samples

CCC took soil samples at the housing area, around the study buildings, and at the crusher site. Researchers wanted a better idea of Pb background information, even if not directly applicable to the estimate of Pb loadings transferred from the buildings to crushed concrete products.

Table 3 lists results of soil samples taken along the drip line of the study buildings. Four samples were taken from each building and combined into one composite from each building.

Table 3. Lead concentration in soil samples taken near buildings.

Building Number	Pb conc. (ppm)
223	60
225 / 227	30
226	30

Table 4 lists samples taken at the crusher site. The material taken was a mixture of soil and crushed concrete residue.

Table 4. Lead concentration in soil samples taken at crusher site.

Location	Pb conc. (ppm)
Near the crusher	30
Intermediate distance from the crusher	40
Distant from the crusher	30

Both Table 3 and Table 4 show some low level of Pb at these locations, but the values are much lower than the residential soil limit of 400 ppm.

Air samples

The collection of air samples was conducted over a period of several days, near various workers, conducting varied tasks. The PEL for Pb for construction workers is 50 µg/m^3. It is normally not anticipated that outdoor construction operations would generate these levels. The action level is 30

μg/m³, which is also uncommon for outdoor construction. California regulations require that a “risk exposure” be conducted to determine worker exposure to Pb-laden dust during construction projects where disturbance of known LBP exists. This demolition project was preceded by an “abatement activity” whereby all identified LBP was to be removed. However, the scope and effectiveness of this activity is questionable because of the LBP found in the study buildings, as described later in this report. Figure 5 shows interior demolition work. Table 5 lists airborne Pb exposure to workers at the demolition site.

Figure 5. Interior demolition.

Table 5. Worker exposure to airborne Pb at demolition site.

Sample Date	Location	8-hr Time Weighted Average (μg/m³)
10/Feb/2003	Bobcat operator	<1.67
10/Feb/2003	Interior demolition	<1.67
10/Feb/2003	Interior demolition	<1.67
10/Feb/2003	Outside laborer	<1.67
11/Feb/2003	Interior demolition	<1.67
11/Feb/2003	Interior demolition	<1.67
11/Feb/2003	Exterior worker	<1.67
11/Feb/2003	Bobcat operator	<1.67
20/Feb/2003	Excavator operator	<1.67
20/Feb/2003	Waterman	<1.67

As evident from the results in Table 5, between the Contractor's use of water spray from tanker trucks for dust control (Figure 6), and the heavy, humid air of the rainy season conditions, the levels of air-borne, lead-laden dust were below normally detectable levels. These combined factors produce a very low risk of worker exposure to lead-laden dust at the demolition site.

General working conditions at a concrete crushing plant normally produce a dusty work environment. Dust control water spray systems are a necessity. Dust control was used while the following air samples were collected (Table 6), both from equipment operators and downwind from the crushing plant.

Figure 6. Dust control truck.

Table 6. Air monitoring at crusher site.

Sample Date	Location	8-hr Time Weighted Average (µg/m^3)
21/Feb/2003	Excavator operator #1	<1.67
21/Feb/2003	Water hose operator #1	<1.67
21/Feb/2003	Excavator operator #2	<1.67
21/Feb/2003	Water hose operator #2	<1.67
21/Feb/2003	High volume air sampler downwind #1	<1.67
21/Feb/2003	High volume air sampler downwind #2	<1.67

As can be seen in Table 6, the levels of worker and ambient exposure to air-borne lead-laden dust are nondetectable. These sample results were consistent with the worker results collected from the demolition site. Over the entire period of sample collection, not a single sample revealed a Pb level above detectable limits. Therefore, no additional air monitoring was performed.

Paint samples

As mentioned previously, interior paints had an asbestos component, as well as Pb content. Because of the asbestos, all interior wall surfaces were scraped, and most walls were covered in a sealant material, which is a sign of abatement completion. Some paint still remained on interior walls (Figure 7), and exterior paint remained intact. CCC sampled all wall surfaces for Pb content. The purpose was to help calculate the overall Pb content of the structures. CERL also took concrete samples, as described in the next section. The results of the Pb content of the paint samples are included in Table 7.

Figure 7. Remaining coating on interior walls.

Table 7. Paint sampling data.

House Number	Sample Location	Pb Concentration in paint (ppm)	Mass Pb per wall area (g/ft^2)
223	Living room, 4 wall composite	2,210	0.0024
223	Kitchen, 3 wall composite	1,280	0.0014
223	Bathroom, 3 wall composite	2,290	0.0026
223	Bedroom #1, 4 wall composite	1,120	0.0013
223	Bedroom #2, 2 wall composite	1,330	0.0014
223	Hall	720	0.0008
223	Exterior wall #1	3,060	0.0036
223	Exterior wall #2	4,040	0.0046
223	Exterior wall #3	8,220	0.0094
223	Exterior wall #4	3,240	0.0037
223	Exterior wall #5	3,200	0.0036
223	Exterior, CERL sample 26	3,800	*
225/227	Living room, 4 wall composite	2,860	0.0034
225/227	Kitchen, 3 wall composite	3,090	0.0034
225/227	Bathroom, 3 wall composite	2,640	0.0026
225/227	Bedroom #1, 3 wall composite	2,120	0.0031
225/227	Bedroom #2, 3 wall composite	2,290	0.0025
225/227	Hall, 2 wall composite	2,880	0.0034
225	Interior, CERL sample 29	5,900	*
225/227	Exterior wall #1	3,040	0.0035
225/227	Exterior wall #2	2,860	0.0033
225/227	Exterior wall #3	3,170	0.0037
225/227	Exterior wall #4	4,940	0.0056
225/227	Exterior wall #5	16,550	0.0198
225	Roof deck, CERL sample 28	3,900	*
226	Living room, 4 wall composite	2,350	0.0009
226	Kitchen, 3 wall composite	780	0.0028
226	Bathroom, 3 wall composite	870	0.0013
226	Bedroom #1, 3 wall composite	1,070	0.0010
226	Bedroom #2, 3 wall composite	1,050	0.0012
226	Utility room	2,900	0.0032
226	Interior, CERL sample 32	330	*
224	Exterior, CERL sample 30	5,100	*
226	Exterior wall #1	3,070	0.0035
226	Exterior wall #2	4,070	0.0047
226	Exterior wall #3	3,670	0.0042
226	Exterior wall #4	1,270	0.0015
226	Exterior wall #5	11,500	0.0133
CERL sample 16	Low density concrete roof deck	3,000	*
CERL sample 17	Low density concrete roof deck	1,700	*

* Not measured.

Table 8 summarizes the data in Table 7 by averaging the values by building and by location.

Table 8. Paint sample data summary.

House Number	Sample Location	Pb Concentration (ppm)	Mass Pb per wall area (g/ft^2)
223	Interior	1,492	0.0017
223	Exterior	4,260	0.0050
225/227	Interior	3,111	0.0031
225/227	Exterior	6,112	0.0072
226	Interior	1,336	0.0017
226	Exterior	4,780	0.0054
any	roof deck	2,867	0.0033

Due to the presence of Pb in the paint, workers inside these type of buildings should wear appropriate respiratory protection, especially when performing dust-generating demolition tasks.

Concrete samples

In addition to the CCC paint samples described in the previous section, CERL also took several samples for Pb analysis from the housing site and the crusher site. These samples represented the range of materials (Figure 9 for example) that would be combined at the crusher site to produce the recycled concrete aggregate (Figure 9) for use as road base and other products. CERL took 34 samples, and subjected them to various combinations of Pb analysis. Table 9 summarizes analytical results from these samples.

Figure 8. Painted concrete piece.

Figure 9. Finished recycled concrete aggregate.

Table 9. Summary of CERL concrete samples.

Material	Total Pb (ppm)	Density (lb/ft³)
Crushed concrete product, old	17.0	62.89
Crushed concrete product, recent	16.7	55.37
Asphalt concrete, from street	1.5	
Asphalt concrete, from driveway	17.0	
Floor slab	2.4	142.80
Light concrete, painted, before crushing	305.0	90.38
Exterior wall	248.1	
Interior wall	250.7	
Roof deck	560.0	
Concrete pavement	<1.0	148.77
Fines from under conveyor	110.7	58.68

Concrete density was determined using American Society for Testing and Materials (ASTM) method C642-9 (ASTM 1997). In addition to the analyses listed here, at least one sample from each material type was subjected to the TCLP test for Pb. In every case, the result was less than 0.010 ppm.

SI Consulting (Mill Valley, CA) took 50 core samples from 25 of the Hayes Park buildings (Kroeker 2002). The core samples had a range in total Pb concentration between 18 and 160 ppm, with an average of 51.

3 Modeling

Approach

One goal of this study was to demonstrate a method for accurately predicting Pb concentration in recycled concrete aggregate (RCA) product based on measurements of LBP concentrations and building dimensions, before the demolition work proceeded.

The previous chapter listed the LBP and concrete sampling results. The next step is to construct models of the buildings to estimate the mass and surface of each of the building components (e.g., interior walls or pavement). The modeling is done using the "reverse quantity take-off" method, which means estimating the quantity of materials that go into a building, based on observation and measurement of a standing building.

Figures 10, 11, and 12 show line drawings of buildings 223, 224, and 225 Napier Street based on field measurements. House 224 is half of a duplex with 226; 225 is duplexed with 227. Each side is a mirror image. It is assumed that paint measurements for building 224 will be valid for 226.

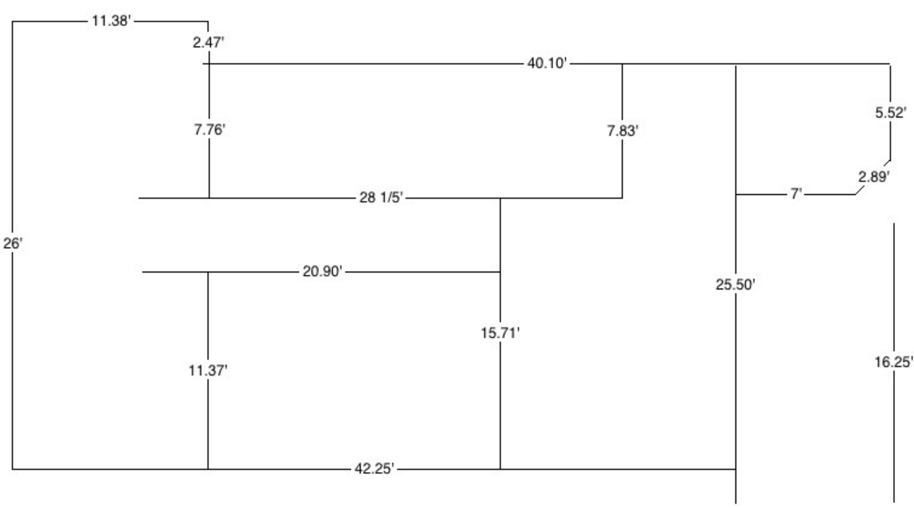

Figure 10. Line drawing of 223 Napier Street.

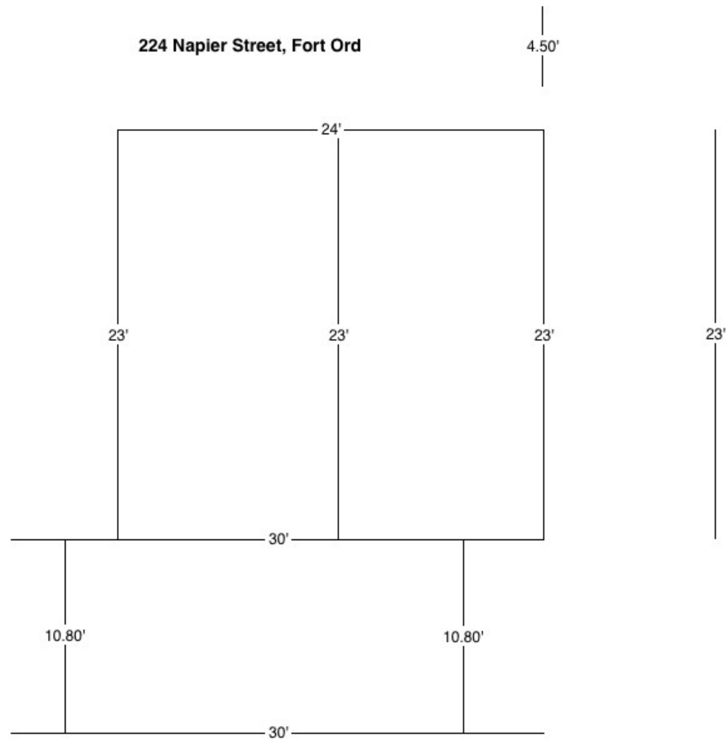

Figure 11. Line drawing of 224 Napier Street.

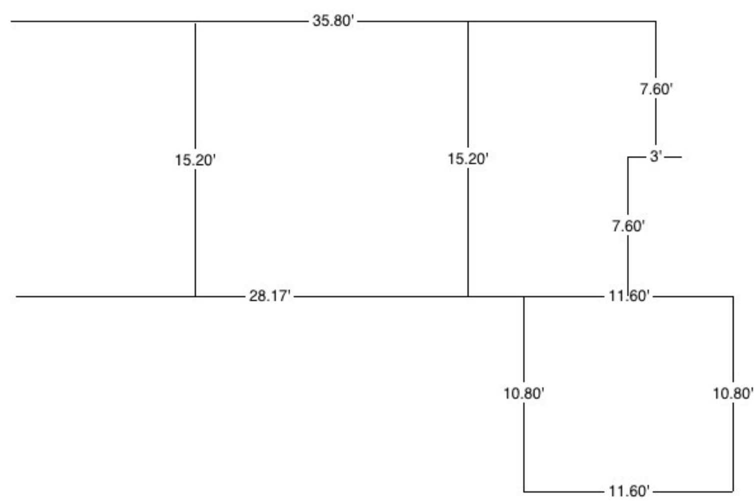

Figure 12. Line drawing of 225 Napier Street.

Calculations

Based on Figures 10–12 and some design assumptions for residential-scale construction, CERL developed surface area models for each of the three structures, as summarized in Table 10. Mass calculations are highlighted.

Table 10. Reverse quantity take-off.

Location	223	224	225
Interior wall surface area (ft^2)	2,955.8	1,236.2	1,018.8
Exterior wall surface area (ft^2)	1,499.7	1,577.6	734.0
Wall volume (ft^3)	855.3	667.8	377.0
Wall concrete density (pounds/ft^3)	90.0	90.0	90.0
Wall mass (g)	34.9E+6	27.3E+6	15.4E+6
Roof deck exterior area (ft^2)	1,497.2	1,366.0	783.7
Ceiling area (ft^2)	1,090.0	876.0	646.6
Roof deck volume (ft^3)	748.6	683.0	391.9
Roof deck density (pound/ft^3)	45.0	45.0	45.0
Roof deck mass (g)	15.3E+6	14.0E+6	8.0E+6
Floor area (ft^2)	1,090.0	876.0	646.6
Floor slab volume (ft^3)	471.7	376.8	298.2
Floor slab mass (g)	30.6E+6	24.5E+6	19.4E+6
Concrete footers (ft^3)	155.8	122.8	110.7
Density floor and footer (pound/ft^3)	143.0	143.0	143.0
Mass footer (g)	10.1E+6	8.0E+6	7.2E+6
Carport concrete volume (ft^3)	144.9	155.7	141.6
Concrete apron on drive volume (ft^3)	29.4	49.3	52.8
Asphalt drive volume (ft^3)	30.8	58.7	44.8
Mass asphalt drive (g)	1.8E+6	3.5E+6	2.6E+6
Asphalt street volume associated with this building (ft^3)	198.5	125.5	174.5
Concrete curb volume (ft^3)	36.7	22.8	18.5
Concrete sidewalk volume (ft^3)	102.1	154.5	98.6
Density for all exterior pavement (incl. carport, apron, curb, and sidewalk) (pound/ft^3)	150.0	150.0	150.0
Mass exterior concrete (g)	21.3E+6	26.0E+6	21.2E+6
Density asphalt (pound/ft^3)	130.0	130.0	130.0
Mass of asphalt street, per building (g)	11.7E+6	7.4E+6	10.3E+6
Total mass of material to crush, per building (g)	125.8E+6	110.6E+6	84.1E+6

The next step is to combine the material quantities in Table 10 with the paint sampling data to compute an expected overall Pb concentration in RCA when the entire mass of the building is crushed together. This includes walls, foundation, pavements, street, etc. These calculations are

shown in the following three tables. Tables 11, 12, and 13 calculate the overall Pb concentration per building based on the surface Pb measurements taken by CCC. These calculations are repeated, first based on solid concrete samples, and second based on paint concentrations collected by CCC, multiplied by an assumed paint thickness of 10 mils, to get a Pb loading rate. Table 14 summarizes the results of all three methods.

Table 11. Overall Pb computation for building 223.

Item	Mass (g)	Bulk Pb conc (ppm)	Mass Pb (g)	Painted Surface area (ft^2)	Pb paint (or dust) conc (g/ft^2)	Mass Pb from paint (g)	Total mass Pb (g)
Interior walls	34.9E+6			2,956	0.0017	5.0	5.0
Exterior walls				1,500	0.005	7.5	7.5
Ceiling	15.3E+6			1,090	0.0017	1.9	1.9
Floor	30.6E+6	2.4	73	1,090	0.001957	2.1	75.6
Roof deck exterior				1,497	0.0033	4.9	4.9
Footing	10.1E+6	0	0				0.0
Exterior concrete	21.3E+6	0	0				0.0
Asphalt drive	1.8E+6	17	31				30.9
Asphalt street	11.7E+6	1.5	18				17.6
Total ppm Pb	1.14						

Table 12. Overall Pb computation for building 224.

Item	Mass (g)	Bulk Pb conc (ppm)	Mass Pb (g)	Painted Surface area (ft^2)	Pb paint (or dust) conc (g/ft^2)	Mass Pb from paint (g)	Total mass Pb (g)
Interior walls	27.3E+6			1,236	0.0017	2.1	2.1
Exterior walls				1,578	0.0054	8.5	8.5
Ceiling	14.0E+6			876	0.0017	1.5	1.5
Floor	24.5E+6	2.4	59	876	0.000179	0.2	58.9
Roof deck exterior				1,366	0.0033	4.5	4.5
Footing	8.0E+6	0	0				0.0
Exterior concrete	26.0E+6	0	0				0.0
Asphalt drive	3.5E+6	17	59				58.9
Asphalt street	7.4E+6	1.5	11				11.1
Total ppm Pb	1.32						

Table 13. Overall Pb computation for building 225.

Item	Mass (g)	Bulk Pb conc (ppm)	Mass Pb (g)	Painted Surface area (ft^2)	Pb paint (or dust) conc (g/ft^2)	Mass Pb from paint (g)	Total mass Pb (g)
Interior walls	15.4E+6			1,019	0.0031	3.2	3.2
Exterior walls				734	0.0072	5.3	5.3
Ceiling	8.0E+6			647	0.0031	2.0	2.0
Floor	19.4E+6	2.4	46	647	0.000356	0.2	46.7
Roof deck exterior				784	0.0033	2.6	2.6
Footing	7.2E+6	0	0				0.0
Exterior concrete	21.2E+6	0	0				0.0
Asphalt drive	2.6E+6	17	45				44.9
Asphalt street	10.3E+6	1.5	15				15.5
Total ppm Pb	1.43						

Table 14. Comparison of total Pb calculations.

Building/sample	Pb conc (ppm)
223 with CCC paint data	1.14
224 with CCC paint data	1.32
225 with CCC paint data	1.43
223 with CERL concrete data	138.66
224 with CERL concrete data	133.68
225 with CERL concrete data	100.36
223 with assumed paint thickness	5.23
224 with assumed paint thickness	5.33
225 with assumed paint thickness	5.41

Comparison of calculations

Of all the measurements of Pb in concrete presented in this report, the direct measurement of Pb in aggregate listed in Table 9 (e.g., about 17 ppm for RCA product) is the most accurate. However, these results are after demolition and crushing; therefore, it would be desirable to be able to predict this concentration using the estimates described above. The three types of paint data used in the previous section are:

- Pb concentration from scraping walls, grams of Pb per square foot of wall surface
- Overall Pb concentration throughout a solid surface (wall cross section), ppm Pb

- Pb concentration from other discrete paint samples, collected from walls or large painted pieces of demolition debris.

The first and third methods should be numerically similar with variation due to differences in specific starting samples. These results may slightly underestimate the actual value because all of the Pb from a surface may not be removed during the sampling activity.

The second method (concentration of solid samples) seems to overestimate the actual end value, as sampled at the crusher site. This result is probably due to difficulty in obtaining and preparing solid samples that are truly representative of, for example, the entire cross section of a wall.

4 Conclusions

Comparison of modeling and sampling

To perform total Pb analysis, an environmental chemistry laboratory requires only a few grams of material. A representative sample from a concrete demolition project might be several kilograms. The problem arises when trying to prepare a representative subsample. This is a long recognized problem with determining overall Pb concentration for building debris when trying to take representative samples for TCLP for RCRA hazardous waste determination (Figure 13).

Therefore, based on this exercise, the author recommends a systematic, representative sampling plan utilizing paint samples, as opposed to solid debris samples. Of course, this applies only to painted surfaces. In the case of this study project, only solid samples can be taken from nonpainted materials such as pavements.

Figure 13. LBP covered concrete in mixed debris pile.

General work site assessment

Based upon several weeks of worker observation, including monitoring of demolition contractor dust control procedures, worker practices, and analytical evaluation of samples collected during actual demolition and concrete recycling operations, these are the key observations:

- During the overall personnel monitoring of various worker activities, no recordable levels of Pb were identified
- Analysis of soils collected at the designated test structures showed no appreciable levels of Pb
- Levels of Pb found in the processed concrete compared favorably with the average levels identified at the test structures (i.e., no significant variations of recycled concrete Pb levels compared to soil Pb levels prior to demolition)
- Samples collected from within the abated structures revealed significant levels of LBP remaining on the wall surfaces.
- Wipe samples from the interior surfaces also showed high levels of Pb.

The following conclusions were drawn based on careful review of the sample data and photographs documenting worker practices:

The low levels (nondetectable) of worker Pb dust exposure can be largely attributed to the Contractor's attention to dust control. Additionally, the demolition activities were conducted during a time when seasonal rains and heavy, humid air prevailed. This obviously contributed to low worker exposure to airborne Pb dust.

The levels of Pb at the recycling facility were directly related to high levels of Pb found at the structures prior to demolition. However, these levels were diluted at the crushing plant as the concrete was processed and the Pb-bearing surfaces were mixed throughout the bulk of the concrete. Although dilution is not normally embraced as a solution to Pb abatement, it appears to be reasonable in this case and, therefore, likely an acceptable practice. The low levels of Pb found in the processed concrete would further be stabilized when reused as road base, as was the intent of this project. As road base, the risk of exposure to children would be very low.

Results summary

Eight paint samples were taken from the three study buildings on Napier Street and the crusher site. The average total Pb concentration in the paint was 3,700 ppm. This number is very reasonable and expected.

Eleven samples of crushed concrete product were taken from various locations around the finished RCA pile at the crusher site. The average total Pb concentration was 17 ppm. Seventeen is a little above the expected background number. Given the source and intended application as a road base, however, the concentration is quite low and should not be an impediment to using RCA. TCLP Pb extractions were performed for two of the RCA samples with the highest total Pb concentration. In both cases, the result was less than 0.01 ppm — far below the RCRA limit of 5.

Three samples of fines from under the crusher were taken one evening as the crew was cleaning up. The average total Pb concentration was 111 ppm. It appears that this type of location is a major sink for LBP particles (Figure 14). Through the crushing process, loose paint flakes off and enters the fines waste stream. The Pb concentration in the fines is below the USEPA limit for Pb-in-soil for residential application. Because the fines are respirable as workers move around and clean up, appropriate personal protective equipment is recommended. CERL performed TCLP for Pb on the two samples with the highest total Pb (160 and 130 ppm). As with the crushed RCA product, the result was less than 0.01 ppm. The Pb in the fines would

Figure 14. Fines sample location.

be expected to be more “leachable” because more surface area is exposed to interaction with the acid test solution. However, much more concrete surface area is also exposed, which will neutralize the extracting solution.

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REPORT DOCUMENTATION PAGE

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Copies are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

14. ABSTRACT

The presence of lead-based paint on concrete from demolition projects raises questions regarding suitable reuse or disposal. The regulatory environment is unclear on issues of reuse. This report attempts to correlate the concentration of lead on a painted building to the concentration of lead in aggregate produced from that building's demolition. This final concentration is the key metric in determining suitable end use. In this case of former Army family housing, the final lead concentration was found to be quite low.

15. SUBJECT TERMS

lead-based paint	concrete	recycling
aggregate	Ft. Ord, CA	family housing

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER (include area code)
Unclassified	Unclassified	Unclassified	SAR	34	

NSN 7540-01-280-5500

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. 239.18

Appendix E
EDR Radius Map Report

Tethered Aerostat Radar

Tethered Aerostat Radar

Matagorda, TX 77457

Inquiry Number: 2284889.3

August 05, 2008

Certified Sanborn® Map Report

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

8/05/08

Site Name:	**Client Name:**
Tethered Aerostat Radar	Environmental Express
Tethered Aerostat Radar	2631 Bulverde Rd
Matagorda, TX 77457	Bulverde, TX 78163
EDR Inquiry # 2284889.3	Contact: Jackie Baerwald

EDR® Environmental Data Resources Inc

The complete Sanborn Library collection has been searched by EDR, and fire insurance maps covering the target property location provided by Environmental Express Serv,EES were identified for the years listed below. The certified Sanborn Library search results in this report can be authenticated by visiting www.edrnet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by Sanborn Library LLC, the copyright holder for the collection.

Certified Sanborn Results:

Site Name:	Tethered Aerostat Radar
Address:	Tethered Aerostat Radar
City, State, Zip:	Matagorda, TX 77457
Cross Street:	
P.O. #	NA
Project:	NA
Certification #	91D6-4268-BA29

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Total Maps: 0

Sanborn® Library search results
Certification # 91D6-4268-BA29

The Sanborn Library includes more than 1.2 million Sanborn fire insurance maps, which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ✔ Library of Congress
- ✔ University Publications of America
- ✔ EDR Private Collection

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Tethered Aerostat Radar
Tethered Aerostat Radar
Matagorda, TX 77457

Inquiry Number: 2284889.2s
August 05, 2008

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

TETHERED AEROSTAT RADAR
MATAGORDA, TX 77457

COORDINATES

Latitude (North):	28.710560 - 28˚ 42' 38.0''
Longitude (West):	95.957780 - 95˚ 57' 28.0''
Universal Tranverse Mercator:	Zone 15
UTM X (Meters):	211038.3
UTM Y (Meters):	3179329.0
Elevation:	5 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	28095-F8 MATAGORDA, TX
Most Recent Revision:	1972

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

FEDERAL RECORDS

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
Delisted NPL	National Priority List Deletions
NPL LIENS	Federal Superfund Liens
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP	CERCLIS No Further Remedial Action Planned
LIENS 2	CERCLA Lien Information
CORRACTS	Corrective Action Report
RCRA-TSDF	RCRA - Transporters, Storage and Disposal
RCRA-LQG	RCRA - Large Quantity Generators

RCRA-SQG	RCRA - Small Quantity Generators
RCRA-CESQG	RCRA - Conditionally Exempt Small Quantity Generator
RCRA-NonGen	RCRA - Non Generators
US ENG CONTROLS	Engineering Controls Sites List
US INST CONTROL	Sites with Institutional Controls
ERNS	Emergency Response Notification System
HMIRS	Hazardous Materials Information Reporting System
DOT OPS	Incident and Accident Data
US CDL	Clandestine Drug Labs
US BROWNFIELDS	A Listing of Brownfields Sites
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
LUCIS	Land Use Control Information System
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations
ODI	Open Dump Inventory
MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System

STATE AND LOCAL RECORDS

SHWS	State Superfund Registry
IOP	Innocent Owner/Operator Program
SWF/LF	Permitted Solid Waste Facilities
CLI	Closed Landfill Inventory
WasteMgt	Commercial Hazardous & Solid Waste Management Facilities
LTANKS	Leaking Petroleum Storage Tank Database
AST	Petroleum Storage Tank Database
DEL SHWS	Deleted Superfund Registry Sites
LIENS	Environmental Liens Listing
SPILLS	Spills Database
AUL	Sites with Controls
VCP	Voluntary Cleanup Program Database
DRYCLEANERS	Drycleaner Registration Database Listing
PRIORITYCLEANERS	Dry Cleaner Remediation Program Prioritization List
BROWNFIELDS	Brownfields Site Assessments
ENF	Notice of Violations Listing
Ind. Haz Waste	Industrial & Hazardous Waste Database
ED AQUIF	Edwards Aquifer Permits
AIRS	Current Emission Inventory Data
TIER 2	Tier 2 Chemical Inventory Reports
MSD	Municipal Settings Designations Database

EXECUTIVE SUMMARY

HIST LIENS	Environmental Liens Listing
RWS	Radioactive Waste Sites

TRIBAL RECORDS

INDIAN RESERV	Indian Reservations
INDIAN ODI	Report on the Status of Open Dumps on Indian Lands
INDIAN LUST	Leaking Underground Storage Tanks on Indian Land
INDIAN UST	Underground Storage Tanks on Indian Land
INDIAN VCP	Voluntary Cleanup Priority Listing

EDR PROPRIETARY RECORDS

Manufactured Gas Plants	EDR Proprietary Manufactured Gas Plants

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STATE AND LOCAL RECORDS

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Texas Commission on Environmental Quality's Petroleum Storage Tank Database.

A review of the UST list, as provided by EDR, and dated 05/06/2008 has revealed that there is 1 UST site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
SALLYS GROC	S HWY 60	1/8 - 1/4 NE	1	6

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
HU-MAR CHEMICALS	SHWS
USAF AEROSTAT SITE	AST
BAY CITY	CLI, Ind. Haz Waste
BAY CITY SW	CLI
WADSWORTH	CLI

OVERVIEW MAP - 2284889.2s

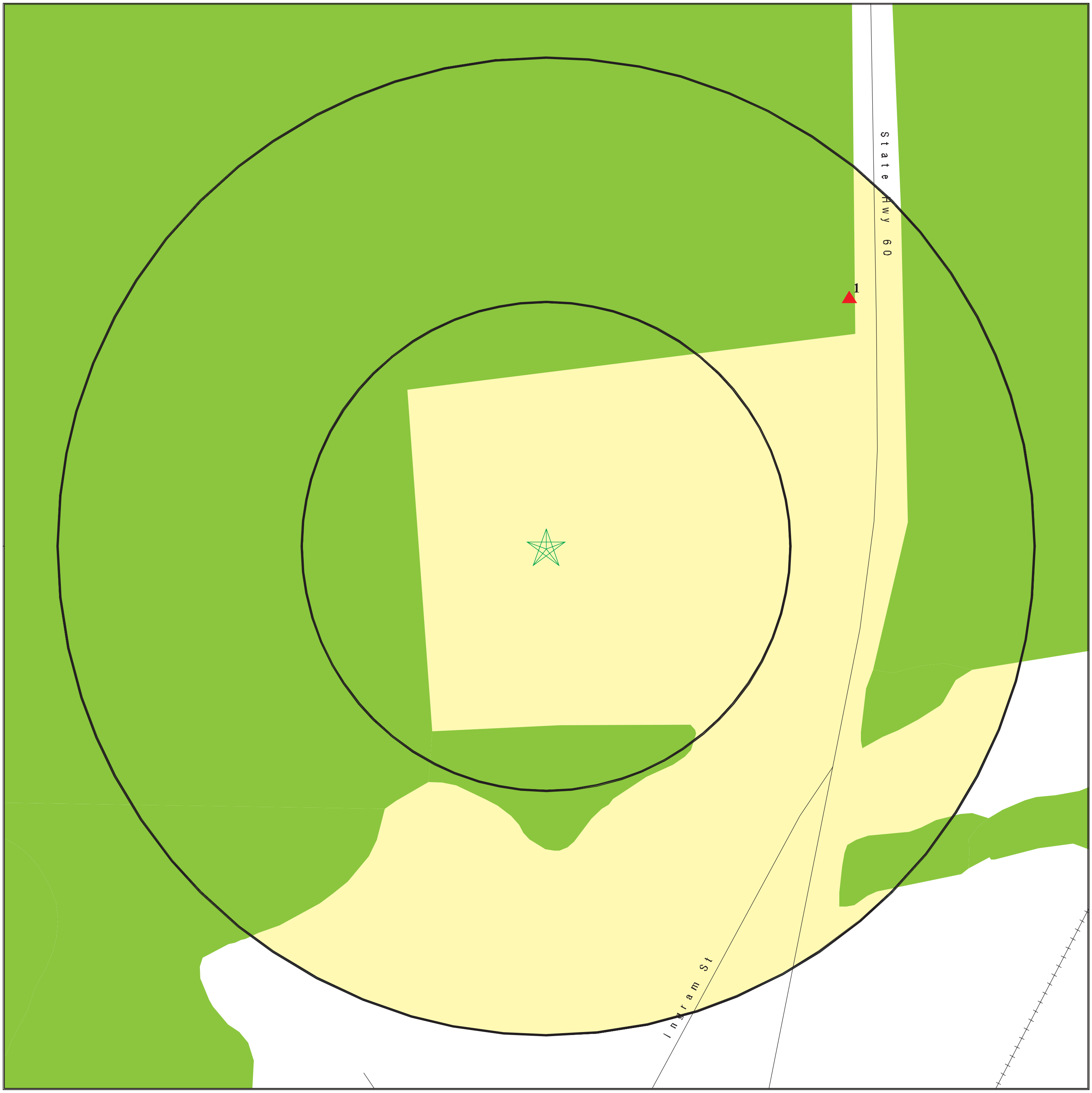
- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites

- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Tethered Aerostat Radar	CLIENT: Environmental Express Serv,EES
ADDRESS: Tethered Aerostat Radar Matagorda TX 77457	CONTACT: Jackie Baerwald
	INQUIRY #: 2284889.2s
LAT/LONG: 28.7106 / 95.9578	DATE: August 05, 2008 10:13 am

DETAIL MAP - 2284889.2s



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
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- 500-year flood zone
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SITE NAME:	Tethered Aerostat Radar	CLIENT:	Environmental Express Serv,EES
ADDRESS:	Tethered Aerostat Radar	CONTACT:	Jackie Baerwald
	Matagorda TX 77457	INQUIRY #:	2284889.2s
LAT/LONG:	28.7106 / 95.9578	DATE:	August 05, 2008 10:13 am

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
FEDERAL RECORDS								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
Delisted NPL		1.000	0	0	0	0	NR	0
NPL LIENS		TP	NR	NR	NR	NR	NR	0
CERCLIS		0.500	0	0	0	NR	NR	0
CERC-NFRAP		0.500	0	0	0	NR	NR	0
LIENS 2		TP	NR	NR	NR	NR	NR	0
CORRACTS		1.000	0	0	0	0	NR	0
RCRA-TSDF		0.500	0	0	0	NR	NR	0
RCRA-LQG		0.250	0	0	NR	NR	NR	0
RCRA-SQG		0.250	0	0	NR	NR	NR	0
RCRA-CESQG		0.250	0	0	NR	NR	NR	0
RCRA-NonGen		0.250	0	0	NR	NR	NR	0
US ENG CONTROLS		0.500	0	0	0	NR	NR	0
US INST CONTROL		0.500	0	0	0	NR	NR	0
ERNS		TP	NR	NR	NR	NR	NR	0
HMIRS		TP	NR	NR	NR	NR	NR	0
DOT OPS		TP	NR	NR	NR	NR	NR	0
US CDL		TP	NR	NR	NR	NR	NR	0
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
DOD		1.000	0	0	0	0	NR	0
FUDS		1.000	0	0	0	0	NR	0
LUCIS		0.500	0	0	0	NR	NR	0
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0
UMTRA		0.500	0	0	0	NR	NR	0
DEBRIS REGION 9		0.500	0	0	0	NR	NR	0
ODI		0.500	0	0	0	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
TRIS		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
FTTS		TP	NR	NR	NR	NR	NR	0
HIST FTTS		TP	NR	NR	NR	NR	NR	0
SSTS		TP	NR	NR	NR	NR	NR	0
ICIS		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
RADINFO		TP	NR	NR	NR	NR	NR	0
FINDS		TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
STATE AND LOCAL RECORDS								
SHWS		1.000	0	0	0	0	NR	0
IOP		TP	NR	NR	NR	NR	NR	0
SWF/LF		0.500	0	0	0	NR	NR	0
CLI		0.500	0	0	0	NR	NR	0
WasteMgt		TP	NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LTANKS		0.500	0	0	0	NR	NR	0
UST		0.250	0	1	NR	NR	NR	1
AST		0.250	0	0	NR	NR	NR	0
DEL SHWS		1.000	0	0	0	0	NR	0
LIENS		TP	NR	NR	NR	NR	NR	0
SPILLS		TP	NR	NR	NR	NR	NR	0
AUL		0.500	0	0	0	NR	NR	0
VCP		0.500	0	0	0	NR	NR	0
DRYCLEANERS		0.250	0	0	NR	NR	NR	0
PRIORITYCLEANERS		0.500	0	0	0	NR	NR	0
BROWNFIELDS		0.500	0	0	0	NR	NR	0
ENF		TP	NR	NR	NR	NR	NR	0
Ind. Haz Waste		TP	NR	NR	NR	NR	NR	0
ED AQUIF		TP	NR	NR	NR	NR	NR	0
AIRS		TP	NR	NR	NR	NR	NR	0
TIER 2		TP	NR	NR	NR	NR	NR	0
MSD		0.500	0	0	0	NR	NR	0
HIST LIENS		TP	NR	NR	NR	NR	NR	0
RWS		TP	NR	NR	NR	NR	NR	0
TRIBAL RECORDS								
INDIAN RESERV		1.000	0	0	0	0	NR	0
INDIAN ODI		0.500	0	0	0	NR	NR	0
INDIAN LUST		0.500	0	0	0	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
INDIAN VCP		0.500	0	0	0	NR	NR	0
EDR PROPRIETARY RECORDS								
Manufactured Gas Plants		1.000	0	0	0	0	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

1 **NE** **1/8-1/4** **0.201 mi.** **1061 ft.**	**SALLYS GROC** **S HWY 60** **MATAGORDA, TX 77457**	**UST**	**U001271596** **N/A**

Relative:
Equal

Actual:
5 ft.

UST:

Facility ID:	0039026
Facility Type:	Retail
Name of Facility Manager:	DOUG BERRYMAN
Title of Facility Manager:	OPER. MGR.
Facility Manager Phone:	4092456681
Facility Rural Box:	Not reported
Facility in Ozone non-attainment area:	Not reported
TCEQ No:	065766
Owner ID:	15016
Date Registration Form Received:	050886
Region Number:	12
Number of USTs:	0002
Number of ASTs:	0000
Sign Name on Registration Form:	DOUG BERRYMAN
Title of Signer of Registration Form:	OPER. MGR.
Date of Signature on Registration Form:	043086
Owner Effective Begin Date:	050886

Owner ID:	15016
Owner Name:	EVANS OIL COMPANY INC
Owner Address:	Not reported
Owner PO Box:	PO BOX 2480
Owner City,St,Zip:	BAY CITY, TX 77414
Owner Contact Name:	RONNIE MCELHENNEY
Contact Telephone:	979-245-2424
Owner Type:	Corporation
Mail Undeliverable:	Not reported
Bankruptcy is in effect:	Not reported
Owner Amendment Reason Code:	Owner Contact Changed
Owner Amendment Date:	042904
Number of Facilities reported by Owner:	0022
# Of Underground Storage Tanks:	0054
# Of Aboveground Storage Tanks:	0000

Self-Certification Date:	Not reported
Signature Name:	Not reported
Signature Title Name:	Not reported
Signature Type Text:	Not reported
Certification Submitted Type:	Not reported
Registration Self-Certification Flag:	Not reported
Fees Self-Certification Flag:	Not reported
Financial Assurance Self-Certification flag:	Not reported
Technical standards Self-Certification flag:	Not reported
UST Delivery Certificate Expiration Date:	Not reported

Operator ID:	Not reported
Operator Effective Date:	Not reported
Operator Type:	Not reported
Operator Name:	Not reported
Operator Telephone:	Not reported
Operator Address:	Not reported

SALLYS GROC (Continued) **U001271596**

Operator PO Box:	Not reported
Operator City,St,Zip:	Not reported
Operator Contact Name:	Not reported
Operator Contact Title:	Not reported
Operator Contact Phone:	Not reported
Tank ID:	1
Unit ID:	00103083
Tank Status:	**Removed from the Ground**
Status Date:	12201989
Installation Date:	01011971
Tank Registration Date:	05081986
Capacity:	0005000
Tank Emptied:	No
Tank Construction and Containment:	Not reported
Tank Construction and Containment II:	Not reported
Tank Construction and Containment III:	Not reported
Tank Construction and Containment IV:	Not reported
Pipe Construction and Containment:	Not reported
Pipe Construction and Containment II:	Not reported
Piping Design and Ext. Containment 3:	Not reported
Piping Design and Ext. Containment 4:	Not reported
Type of Piping:	Not reported
Internal Tank Lining Date:	00000000
Tank Material of Construction:	Steel
Other Materials of Construction:	Not reported
Pipe Material of Construction:	Steel
Other Construction and Containment:	Not reported
Pipe Connectors and Valves 1:	Not reported
Pipe Connectors and Valves 2:	Not reported
Pipe Connectors and Valves 3:	Not reported
Tank Corrosion Protection:	Not reported
Tank Corrosion Protection II:	Not reported
Tank Corrosion Protection III:	Not reported
Other Tank Corrosion Protection Text:	None
Tank Corrosion Protection Variance:	No Variance
Pipe Corrosion Protection:	Not reported
Pipe Corrosion Protection II:	Not reported
Pipe Corrosion Protection 3:	Not reported
Other Corrosion Protection:	None
Pipe Corrosion Protection Variance:	No Variance
Stage 1 Vapor Recovery Equipment Status:	Not Reported
Stage 1 Equipment Installed Date:	Not reported
Stage 2 Vapor Recry Equipment Status:	Not Reported
Stage 2 Equipment Installed Date:	Not reported
Equipment Installer:	Not reported
Contractor Registration Number:	Not reported
Tank Tested:	Not reported
Installer License Number:	Not reported
Tank Installer:	Not reported
Self-Certification Date:	Not reported
Compartment:	Not reported
Compartment Letter:	A
Compartment Capacity:	0000000
Compartment Substance Stored:	Gasoline

SALLYS GROC (Continued) **U001271596**

Compartment Other Substance:	Not reported
Tank Release Method Detection I:	Not reported
Tank Release Method Detection II:	Not reported
Tank Release Method Detection III:	Not reported
Other Tank Release Method Detection:	None
Tank Release Detection Variance:	No Variance
Pipe Release Detection Method:	Not reported
Pipe Release Detection Method II:	Not reported
Pipe Release Detection Method III:	Not reported
Other Pipe Release Detection Method:	None
Pipe Release Detection Variance:	No Variance
Spill and Overfill Protection:	Not reported
Spill and Overfill Protection II:	Not reported
Spill and Overfill Protection III:	Not reported
Spill Overfill Prevention Variation:	No Variance

Tank ID:	2
Unit ID:	00103082
Tank Status:	**Removed from the Ground**
Status Date:	12201989
Installation Date:	01011971
Tank Registration Date:	05081986
Capacity:	0005000
Tank Emptied:	No
Tank Construction and Containment:	Not reported
Tank Construction and Containment II:	Not reported
Tank Construction and Containment III:	Not reported
Tank Construction and Containment IV:	Not reported
Pipe Construction and Containment:	Not reported
Pipe Construction and Containment II:	Not reported
Piping Design and Ext. Containment 3:	Not reported
Piping Design and Ext. Containment 4:	Not reported
Type of Piping:	Not reported
Internal Tank Lining Date:	00000000
Tank Material of Construction:	Steel
Other Materials of Construction:	Not reported
Pipe Material of Construction:	Steel
Other Construction and Containment:	Not reported
Pipe Connectors and Valves 1:	Not reported
Pipe Connectors and Valves 2:	Not reported
Pipe Connectors and Valves 3:	Not reported
Tank Corrosion Protection:	Not reported
Tank Corrosion Protection II:	Not reported
Tank Corrosion Protection III:	Not reported
Other Tank Corrosion Protection Text:	None
Tank Corrosion Protection Variance:	No Variance
Pipe Corrosion Protection:	Not reported
Pipe Corrosion Protection II:	Not reported
Pipe Corrosion Protection 3:	Not reported
Other Corrosion Protection:	None
Pipe Corrosion Protection Variance:	No Variance
Stage 1 Vapor Recovery Equipment Status:	Not Reported
Stage 1 Equipment Installed Date:	Not reported
Stage 2 Vapor Recry Equipment Status:	Not Reported
Stage 2 Equipment Installed Date:	Not reported
Equipment Installer:	Not reported
Contractor Registration Number:	Not reported

SALLYS GROC (Continued) **U001271596**

Tank Tested:	Not reported
Installer License Number:	Not reported
Tank Installer:	Not reported
Self-Certification Date:	Not reported
Compartment:	Not reported
Compartment Letter:	A
Compartment Capacity:	0000000
Compartment Substance Stored:	Gasoline
Compartment Other Substance:	Not reported
Tank Release Method Detection I:	Not reported
Tank Release Method Detection II:	Not reported
Tank Release Method Detection III:	Not reported
Other Tank Release Method Detection:	None
Tank Release Detection Variance:	No Variance
Pipe Release Detection Method:	Not reported
Pipe Release Detection Method II:	Not reported
Pipe Release Detection Method III:	Not reported
Other Pipe Release Detection Method:	None
Pipe Release Detection Variance:	No Variance
Spill and Overfill Protection:	Not reported
Spill and Overfill Protection II:	Not reported
Spill and Overfill Protection III:	Not reported
Spill Overfill Prevention Variation:	No Variance

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
MATAGORDA	A100190107	USAF AEROSTAT SITE	HWY 60 S	77457	AST
MATAGORDA	S103259518	BAY CITY SW	APPROX 4 MI SW OF HWY 35/HWY 60 INTX, 1 MI W OF HW	77457	CLI
MATAGORDA	S102747184	BAY CITY	1 MI E OF HWY 35/FM 457 JUNCTION ON S SIDE OF FM 4	77457	CLI, Ind. Haz Waste
MATAGORDA	S103259519	WADSWORTH	1.5 MI NW OF WADSWORTH, .5 MI W OF HWY 60	77457	CLI
PALACIOS	S104547101	HU-MAR CHEMICALS	LOCATED NORTH OF MCGOTHLIN ROAD, BETWEEN THE OLD S	77465	SHWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

FEDERAL RECORDS

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 04/30/2008
Date Data Arrived at EDR: 05/06/2008
Date Made Active in Reports: 06/09/2008
Number of Days to Update: 34

Source: EPA
Telephone: N/A
Last EDR Contact: 07/28/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 10
Telephone 206-553-8665

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 04/30/2008
Date Data Arrived at EDR: 05/06/2008
Date Made Active in Reports: 06/09/2008
Number of Days to Update: 34

Source: EPA
Telephone: N/A
Last EDR Contact: 07/28/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Quarterly

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 04/30/2008
Date Data Arrived at EDR: 05/06/2008
Date Made Active in Reports: 06/09/2008
Number of Days to Update: 34

Source: EPA
Telephone: N/A
Last EDR Contact: 07/28/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: No Update Planned

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 04/08/2008
Date Data Arrived at EDR: 04/25/2008
Date Made Active in Reports: 05/21/2008
Number of Days to Update: 26

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 07/22/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Quarterly

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 12/03/2007
Date Data Arrived at EDR: 12/06/2007
Date Made Active in Reports: 02/20/2008
Number of Days to Update: 76

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 06/17/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Quarterly

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/08/2008
Date Data Arrived at EDR: 03/07/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Varies

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/26/2008
Date Data Arrived at EDR: 04/02/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 34

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: Quarterly

RCRA-TSDF: RCRA - Transporters, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 03/06/2008
Date Data Arrived at EDR: 03/06/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 43

Source: Environmental Protection Agency
Telephone: 214-665-6444
Last EDR Contact: 05/21/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Quarterly

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/06/2008
Date Data Arrived at EDR: 03/06/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 43

Source: Environmental Protection Agency
Telephone: 214-665-6444
Last EDR Contact: 05/21/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 03/06/2008
Date Data Arrived at EDR: 03/06/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 43

Source: Environmental Protection Agency
Telephone: 214-665-6444
Last EDR Contact: 05/21/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/06/2008
Date Data Arrived at EDR: 03/06/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 43

Source: Environmental Protection Agency
Telephone: 214-665-6444
Last EDR Contact: 05/21/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Varies

RCRA-NonGen: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 03/06/2008
Date Data Arrived at EDR: 03/06/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 43

Source: Environmental Protection Agency
Telephone: 214-665-6444
Last EDR Contact: 05/21/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 04/04/2008
Date Data Arrived at EDR: 04/17/2008
Date Made Active in Reports: 05/15/2008
Number of Days to Update: 28

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 06/30/2008
Next Scheduled EDR Contact: 09/29/2008
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 04/04/2008
Date Data Arrived at EDR: 04/17/2008
Date Made Active in Reports: 05/15/2008
Number of Days to Update: 28

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 06/30/2008
Next Scheduled EDR Contact: 09/29/2008
Data Release Frequency: Varies

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 01/23/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 54

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 07/25/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Annually

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 04/16/2008
Date Made Active in Reports: 05/15/2008
Number of Days to Update: 29

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 07/15/2008
Next Scheduled EDR Contact: 10/13/2008
Data Release Frequency: Annually

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 02/14/2008
Date Data Arrived at EDR: 02/27/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 22

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/28/2008
Next Scheduled EDR Contact: 08/25/2008
Data Release Frequency: Varies

CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 12/28/2007
Number of Days to Update: 25

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 06/27/2008
Next Scheduled EDR Contact: 09/22/2008
Data Release Frequency: Quarterly

US BROWNFIELDS: A Listing of Brownfields Sites

Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA’s Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA’s Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 04/01/2008
Date Data Arrived at EDR: 04/30/2008
Date Made Active in Reports: 05/30/2008
Number of Days to Update: 30

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 07/15/2008
Next Scheduled EDR Contact: 10/13/2008
Data Release Frequency: Semi-Annually

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 703-692-8801
Last EDR Contact: 05/09/2008
Next Scheduled EDR Contact: 08/04/2008
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 08/31/2007
Date Made Active in Reports: 10/11/2007
Number of Days to Update: 41

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 06/30/2008
Next Scheduled EDR Contact: 09/29/2008
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005
Date Data Arrived at EDR: 12/11/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 31

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 06/09/2008
Next Scheduled EDR Contact: 09/08/2008
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 02/08/2008
Date Data Arrived at EDR: 04/25/2008
Date Made Active in Reports: 05/30/2008
Number of Days to Update: 35

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 07/21/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 01/14/2008
Date Data Arrived at EDR: 01/22/2008
Date Made Active in Reports: 01/30/2008
Number of Days to Update: 8

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 06/30/2008
Next Scheduled EDR Contact: 09/29/2008
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 07/13/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 06/16/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Varies

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 03/25/2008
Date Data Arrived at EDR: 04/17/2008
Date Made Active in Reports: 05/15/2008
Number of Days to Update: 28

Source: EPA, Region 9
Telephone: 415-972-3336
Last EDR Contact: 06/23/2008
Next Scheduled EDR Contact: 09/22/2008
Data Release Frequency: Varies

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 02/07/2008
Date Data Arrived at EDR: 03/26/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 23

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 06/25/2008
Next Scheduled EDR Contact: 09/22/2008
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2006	Source: EPA
Date Data Arrived at EDR: 02/29/2008	Telephone: 202-566-0250
Date Made Active in Reports: 04/18/2008	Last EDR Contact: 06/16/2008
Number of Days to Update: 49	Next Scheduled EDR Contact: 09/15/2008
	Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002	Source: EPA
Date Data Arrived at EDR: 04/14/2006	Telephone: 202-260-5521
Date Made Active in Reports: 05/30/2006	Last EDR Contact: 07/14/2008
Number of Days to Update: 46	Next Scheduled EDR Contact: 10/13/2008
	Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/11/2008	Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Date Data Arrived at EDR: 04/24/2008	Telephone: 202-566-1667
Date Made Active in Reports: 05/21/2008	Last EDR Contact: 06/16/2008
Number of Days to Update: 27	Next Scheduled EDR Contact: 09/15/2008
	Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/11/2008	Source: EPA
Date Data Arrived at EDR: 04/24/2008	Telephone: 202-566-1667
Date Made Active in Reports: 05/21/2008	Last EDR Contact: 06/16/2008
Number of Days to Update: 27	Next Scheduled EDR Contact: 09/15/2008
	Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/01/2007	Telephone: 202-564-2501
Date Made Active in Reports: 04/10/2007	Last EDR Contact: 12/17/2007
Number of Days to Update: 40	Next Scheduled EDR Contact: 03/17/2008
	Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 03/14/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 07/14/2008
Next Scheduled EDR Contact: 10/13/2008
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 02/28/2008
Date Data Arrived at EDR: 03/18/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 49

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 07/14/2008
Next Scheduled EDR Contact: 10/13/2008
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB’s who are required to notify the EPA of such activities.

Date of Government Version: 12/04/2007
Date Data Arrived at EDR: 02/07/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 39

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 06/20/2008
Next Scheduled EDR Contact: 08/04/2008
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/22/2008
Date Data Arrived at EDR: 05/06/2008
Date Made Active in Reports: 06/09/2008
Number of Days to Update: 34

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 06/30/2008
Next Scheduled EDR Contact: 09/29/2008
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 04/29/2008
Date Data Arrived at EDR: 05/01/2008
Date Made Active in Reports: 05/21/2008
Number of Days to Update: 20

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 07/31/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/08/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 28

Source: EPA
Telephone: (214) 665-2200
Last EDR Contact: 06/30/2008
Next Scheduled EDR Contact: 09/29/2008
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 03/06/2007
Date Made Active in Reports: 04/13/2007
Number of Days to Update: 38

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 06/11/2008
Next Scheduled EDR Contact: 09/08/2008
Data Release Frequency: Biennially

STATE AND LOCAL RECORDS

SHWS: State Superfund Registry

State Hazardous Waste Sites. State hazardous waste site records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. Available information varies by state.

Date of Government Version: 05/08/2008
Date Data Arrived at EDR: 05/15/2008
Date Made Active in Reports: 06/11/2008
Number of Days to Update: 27

Source: Texas Commission on Environmental Quality
Telephone: 512-239-5680
Last EDR Contact: 08/04/2008
Next Scheduled EDR Contact: 10/06/2008
Data Release Frequency: Semi-Annually

IOP: Innocent Owner/Operator Program

Contains information on all sites that are in the IOP. An IOP is an innocent owner or operator whose property is contaminated as a result of a release or migration of contaminants from a source or sources not located on the property, and they did not cause or contribute to the source or sources of contamination.

Date of Government Version: 04/01/2008
Date Data Arrived at EDR: 05/01/2008
Date Made Active in Reports: 06/11/2008
Number of Days to Update: 41

Source: Texas Commission on Environmental Quality
Telephone: 512-239-5894
Last EDR Contact: 07/31/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Quarterly

SWF/LF: Permitted Solid Waste Facilities

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/19/2008
Date Data Arrived at EDR: 06/03/2008
Date Made Active in Reports: 06/11/2008
Number of Days to Update: 8

Source: Texas Commission on Environmental Quality
Telephone: 512-239-6706
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Quarterly

CLI: Closed Landfill Inventory

Closed and abandoned landfills (permitted as well as unauthorized) across the state of Texas.

Date of Government Version: 08/30/1999
Date Data Arrived at EDR: 09/28/2000
Date Made Active in Reports: 10/30/2000
Number of Days to Update: 32

Source: Texas Commission on Environmental Quality
Telephone: 512-239-6016
Last EDR Contact: 07/28/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Varies

WASTEMGT: Commercial Hazardous & Solid Waste Management Facilities

This list contains commercial recycling facilities and facilities permitted or authorized (interim status) by the Texas Natural Resource Conservation Commission.

Date of Government Version: 12/01/2006
Date Data Arrived at EDR: 02/16/2007
Date Made Active in Reports: 03/29/2007
Number of Days to Update: 41

Source: Texas Commission on Environmental Quality
Telephone: 512-239-2920
Last EDR Contact: 08/01/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Varies

LTANKS: Leaking Petroleum Storage Tank Database

An inventory of reported leaking petroleum storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 05/06/2008
Date Data Arrived at EDR: 06/03/2008
Date Made Active in Reports: 06/11/2008
Number of Days to Update: 8

Source: Texas Commission on Environmental Quality
Telephone: 512-239-2200
Last EDR Contact: 08/04/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Quarterly

UST: Petroleum Storage Tank Database

Registered Underground Storage Tanks. UST’s are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 05/06/2008
Date Data Arrived at EDR: 06/03/2008
Date Made Active in Reports: 06/10/2008
Number of Days to Update: 7

Source: Texas Commission on Environmental Quality
Telephone: 512-239-2160
Last EDR Contact: 08/04/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Quarterly

AST: Petroleum Storage Tank Database

Registered Aboveground Storage Tanks.

Date of Government Version: 05/06/2008
Date Data Arrived at EDR: 06/03/2008
Date Made Active in Reports: 06/10/2008
Number of Days to Update: 7

Source: Texas Commission on Environmental Quality
Telephone: 512-239-2160
Last EDR Contact: 08/04/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

DEL SHWS: Deleted Superfund Registry Sites
Sites have been deleted from the state Superfund registry in accordance with the Act, ?361.189

Date of Government Version: 05/08/2008
Date Data Arrived at EDR: 05/15/2008
Date Made Active in Reports: 06/11/2008
Number of Days to Update: 27

Source: Texas Commission on Environmental Quality
Telephone: 512-239-0666
Last EDR Contact: 08/04/2008
Next Scheduled EDR Contact: 10/06/2008
Data Release Frequency: Quarterly

LIENS: Environmental Liens Listing
The listing covers TCEQ liens placed against either State Superfund sites or Federal Superfund sites to recover cost incurred by TCEQ.

Date of Government Version: 06/17/2008
Date Data Arrived at EDR: 06/17/2008
Date Made Active in Reports: 07/28/2008
Number of Days to Update: 41

Source: Texas Commission on Environmental Quality
Telephone: 512-239-2209
Last EDR Contact: 06/16/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Varies

SPILLS: Spills Database
Spills reported to the Emergency Response Division.

Date of Government Version: 07/03/2008
Date Data Arrived at EDR: 07/03/2008
Date Made Active in Reports: 07/28/2008
Number of Days to Update: 25

Source: Texas Commission on Environmental Quality
Telephone: 512-239-0983
Last EDR Contact: 06/16/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Quarterly

AUL: Sites with Controls
Activity and use limitations include both engineering controls and institutional controls.

Date of Government Version: 04/01/2008
Date Data Arrived at EDR: 05/01/2008
Date Made Active in Reports: 06/11/2008
Number of Days to Update: 41

Source: Texas Commission on Environmental Quality
Telephone: 512-239-5891
Last EDR Contact: 04/28/2008
Next Scheduled EDR Contact: 07/28/2008
Data Release Frequency: Varies

VCP RRC: Voluntary Cleanup Program Sites
The Voluntary Cleanup Program (RRC-VCP) provides an incentive to remediate Oil & Gas related pollution by participants as long as they did not cause or contribute to the contamination. Applicants to the program receive a release of liability to the state in exchange for a successful cleanup.

Date of Government Version: 02/27/2008
Date Data Arrived at EDR: 05/01/2008
Date Made Active in Reports: 06/11/2008
Number of Days to Update: 41

Source: Railroad Commission of Texas
Telephone: 512-463-6969
Last EDR Contact: 07/31/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Varies

VCP TCEQ: Voluntary Cleanup Program Database
The Texas Voluntary Cleanup Program was established to provide administrative, technical, and legal incentives to encourage the cleanup of contaminated sites in Texas.

Date of Government Version: 04/01/2008
Date Data Arrived at EDR: 05/01/2008
Date Made Active in Reports: 06/11/2008
Number of Days to Update: 41

Source: Texas Commission on Environmental Quality
Telephone: 512-239-5891
Last EDR Contact: 07/31/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Quarterly

DRYCLEANERS: Drycleaner Registration Database Listing
A listing of drycleaning facilities.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/02/2008
Date Made Active in Reports: 07/28/2008
Number of Days to Update: 26

Source: Texas Commission on Environmental Quality
Telephone: 512-239-2160
Last EDR Contact: 06/30/2008
Next Scheduled EDR Contact: 09/29/2008
Data Release Frequency: Varies

PRIORITY CLEANERS: Dry Cleaner Remediation Program Prioritization List
A listing of dry cleaner related contaminated sites.

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 07/02/2008
Date Made Active in Reports: 07/28/2008
Number of Days to Update: 26

Source: Texas Commisision on Environmenatl Quality
Telephone: 512-239-5658
Last EDR Contact: 07/02/2008
Next Scheduled EDR Contact: 09/29/2008
Data Release Frequency: Varies

BROWNFIELDS: Brownfields Site Assessments
Brownfield site assessments that are being cleaned under EPA grant monies.

Date of Government Version: 04/01/2008
Date Data Arrived at EDR: 05/01/2008
Date Made Active in Reports: 06/11/2008
Number of Days to Update: 41

Source: TCEQ
Telephone: 512-239-5872
Last EDR Contact: 07/31/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Semi-Annually

ENFORCEMENT: Notice of Violations Listing
A listing of permit violations.

Date of Government Version: 06/17/2008
Date Data Arrived at EDR: 06/20/2008
Date Made Active in Reports: 07/28/2008
Number of Days to Update: 38

Source: Texas Commission on Environmental Quality
Telephone: 512-239-6012
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: Semi-Annually

Ind. Haz Waste: Industrial & Hazardous Waste Database
Summary reports reported by waste handlers, generators and shippers in Texas.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 02/28/2008
Date Made Active in Reports: 03/12/2008
Number of Days to Update: 13

Source: Texas Commission on Environmental Quality
Telephone: 512-239-0985
Last EDR Contact: 07/28/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Annually

ED AQUIF: Edwards Aquifer Permits
A listing of permits in the Edwards Aquifer Protection Program database. The information provided is for the counties located in the Austin Region (Hays, Travis, and Williamson counties).

Date of Government Version: 05/23/2008
Date Data Arrived at EDR: 05/23/2008
Date Made Active in Reports: 06/11/2008
Number of Days to Update: 19

Source: Texas Commission on Environmental Quality, Austin Region
Telephone: 512-339-2929
Last EDR Contact: 07/21/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Varies

AIRS: Current Emission Inventory Data
The database lists by company, along with their actual emissions, the TNRCC air accounts that emit EPA criteria pollutants.

Date of Government Version: 06/26/2007
Date Data Arrived at EDR: 09/25/2007
Date Made Active in Reports: 10/31/2007
Number of Days to Update: 36

Source: Texas Commission on Environmental Quality
Telephone: N/A
Last EDR Contact: 07/11/2008
Next Scheduled EDR Contact: 10/06/2008
Data Release Frequency: Semi-Annually

MSD: Municipal Settings Designations Database

An MSD is an official state designation given to property within a municipality or its extraterritorial jurisdiction that certifies that designated groundwater at the property is not use as potable water, and is prohibited from future use as potatable water because that groundwater is contaminated in excess of the applicable potable-water protective concentration level.

Date of Government Version: 07/11/2008
Date Data Arrived at EDR: 07/15/2008
Date Made Active in Reports: 07/28/2008
Number of Days to Update: 13

Source: Texas Commission on Environmental Quality
Telephone: 512-239-4982
Last EDR Contact: 07/14/2008
Next Scheduled EDR Contact: 10/13/2008
Data Release Frequency: Varies

TIER 2: Tier 2 Chemical Inventory Reports

A listing of facilities which store or manufacture hazardous materials and submit a chemical inventory report.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 10/31/2007
Date Made Active in Reports: 01/22/2008
Number of Days to Update: 83

Source: Department of State Health Services
Telephone: 512-834-6603
Last EDR Contact: 06/16/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Annually

RWS: Radioactive Waste Sites

Sites in the State of Texas that have been designated as Radioactive Waste sites.

Date of Government Version: 07/24/2006
Date Data Arrived at EDR: 12/14/2006
Date Made Active in Reports: 01/23/2007
Number of Days to Update: 40

Source: Texas Commission on Environmental Quality
Telephone: 512-239-0859
Last EDR Contact: 06/13/2008
Next Scheduled EDR Contact: 09/08/2008
Data Release Frequency: Semi-Annually

HIST LIENS: Environmental Liens Listing

This listing contains information fields that are no longer tracked in the LIENS database.

Date of Government Version: 03/23/2007
Date Data Arrived at EDR: 03/23/2007
Date Made Active in Reports: 05/02/2007
Number of Days to Update: 40

Source: Texas Commission on Environmental Qualilty
Telephone: 512-239-2209
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

TRIBAL RECORDS

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 05/09/2008
Next Scheduled EDR Contact: 08/04/2008
Data Release Frequency: Semi-Annually

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 05/27/2008
Next Scheduled EDR Contact: 08/25/2008
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 02/25/2008
Date Data Arrived at EDR: 02/26/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 20

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Quarterly

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 02/21/2008
Date Data Arrived at EDR: 02/26/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 23

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 03/17/2008
Date Data Arrived at EDR: 03/27/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 40

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 02/28/2008
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 17

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 03/17/2008
Date Data Arrived at EDR: 03/27/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 40

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Semi-Annually

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 03/12/2008
Date Data Arrived at EDR: 03/14/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 6

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 02/20/2008
Date Data Arrived at EDR: 03/04/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 13

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Quarterly

INDIAN UST R6: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 02/28/2008	Source: EPA Region 6
Date Data Arrived at EDR: 02/29/2008	Telephone: 214-665-7591
Date Made Active in Reports: 03/17/2008	Last EDR Contact: 05/19/2008
Number of Days to Update: 17	Next Scheduled EDR Contact: 08/18/2008
	Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land
A listing of underground storage tank locations on Indian Land.

Date of Government Version: 03/12/2008	Source: EPA, Region 1
Date Data Arrived at EDR: 03/14/2008	Telephone: 617-918-1313
Date Made Active in Reports: 03/20/2008	Last EDR Contact: 05/19/2008
Number of Days to Update: 6	Next Scheduled EDR Contact: 08/18/2008
	Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 02/21/2008	Source: EPA Region 10
Date Data Arrived at EDR: 02/26/2008	Telephone: 206-553-2857
Date Made Active in Reports: 03/20/2008	Last EDR Contact: 05/19/2008
Number of Days to Update: 23	Next Scheduled EDR Contact: 08/18/2008
	Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 06/01/2007	Source: EPA Region 7
Date Data Arrived at EDR: 06/14/2007	Telephone: 913-551-7003
Date Made Active in Reports: 07/05/2007	Last EDR Contact: 05/19/2008
Number of Days to Update: 21	Next Scheduled EDR Contact: 08/18/2008
	Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 03/17/2008	Source: EPA Region 4
Date Data Arrived at EDR: 03/27/2008	Telephone: 404-562-9424
Date Made Active in Reports: 05/06/2008	Last EDR Contact: 05/19/2008
Number of Days to Update: 40	Next Scheduled EDR Contact: 08/18/2008
	Data Release Frequency: Semi-Annually

INDIAN UST R9: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 02/25/2008	Source: EPA Region 9
Date Data Arrived at EDR: 02/26/2008	Telephone: 415-972-3368
Date Made Active in Reports: 03/20/2008	Last EDR Contact: 05/19/2008
Number of Days to Update: 23	Next Scheduled EDR Contact: 08/18/2008
	Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 02/20/2008	Source: EPA Region 8
Date Data Arrived at EDR: 03/04/2008	Telephone: 303-312-6137
Date Made Active in Reports: 03/17/2008	Last EDR Contact: 05/19/2008
Number of Days to Update: 13	Next Scheduled EDR Contact: 08/18/2008
	Data Release Frequency: Quarterly

INDIAN UST R5: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 12/21/2007
Date Data Arrived at EDR: 12/21/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 34

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 04/02/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 07/21/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 07/21/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Varies

EDR PROPRIETARY RECORDS

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 06/15/2007
Date Made Active in Reports: 08/20/2007
Number of Days to Update: 66

Source: Department of Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 06/13/2008
Next Scheduled EDR Contact: 09/08/2008
Data Release Frequency: Annually

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 09/30/2007
Date Data Arrived at EDR: 12/04/2007
Date Made Active in Reports: 12/31/2007
Number of Days to Update: 27

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 04/03/2008
Next Scheduled EDR Contact: 06/30/2008
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 05/27/2008
Date Data Arrived at EDR: 05/29/2008
Date Made Active in Reports: 07/10/2008
Number of Days to Update: 42

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 05/29/2008
Next Scheduled EDR Contact: 08/25/2008
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 12/21/2007
Date Made Active in Reports: 01/10/2008
Number of Days to Update: 20

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 06/09/2008
Next Scheduled EDR Contact: 09/08/2008
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 10/01/2007
Date Data Arrived at EDR: 11/09/2007
Date Made Active in Reports: 01/15/2008
Number of Days to Update: 67

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 06/16/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Annually

VT MANIFEST: Hazardous Waste Manifest Data
Hazardous waste manifest information.

Date of Government Version: 03/17/2008
Date Data Arrived at EDR: 03/26/2008
Date Made Active in Reports: 04/09/2008
Number of Days to Update: 14

Source: Department of Environmental Conservation
Telephone: 802-241-3443
Last EDR Contact: 05/12/2008
Next Scheduled EDR Contact: 08/11/2008
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 04/27/2007
Date Made Active in Reports: 06/08/2007
Number of Days to Update: 42

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 07/21/2008
Next Scheduled EDR Contact: 10/06/2008
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: (800) 823-6277
This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Child Care Facility List
Source: Department of Protective & Regulatory Services
Telephone: 512-438-3269

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

TETHERED AEROSTAT RADAR
TETHERED AEROSTAT RADAR
MATAGORDA, TX 77457

TARGET PROPERTY COORDINATES

Latitude (North):	28.71056 - 28˚ 42’ 38.0’’
Longitude (West):	95.95778 - 95˚ 57’ 28.0’’
Universal Tranverse Mercator:	Zone 15
UTM X (Meters):	211038.3
UTM Y (Meters):	3179329.0
Elevation:	5 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	28095-F8 MATAGORDA, TX
Most Recent Revision:	1972

EDR’s GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

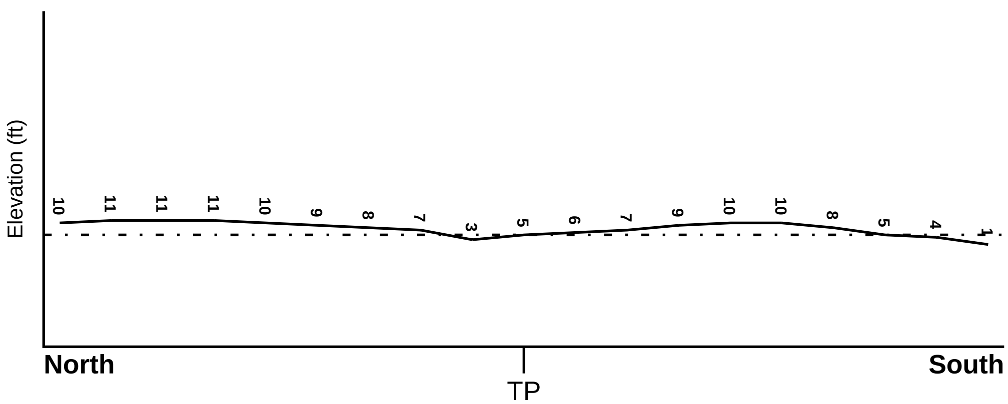
TOPOGRAPHIC INFORMATION

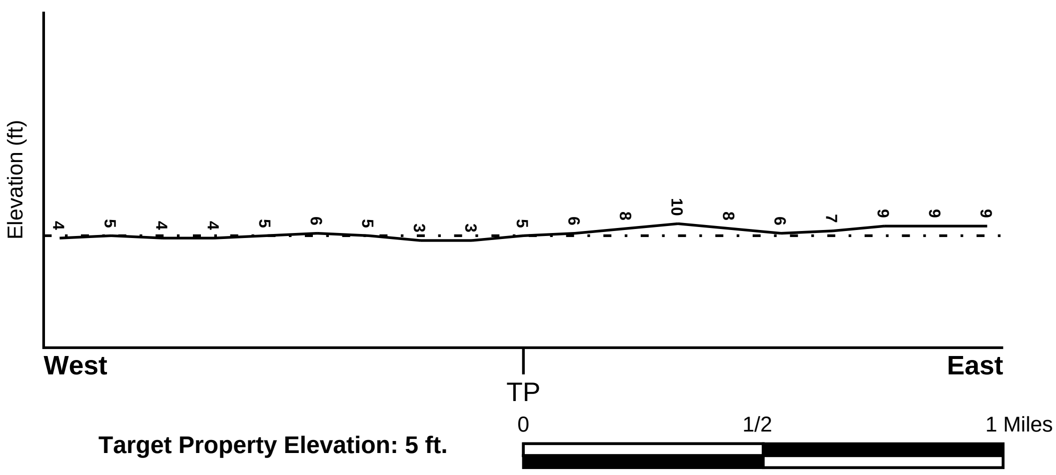
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General West

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: 5 ft.

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
MATAGORDA, TX	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 4854890555D

Additional Panels in search area: Not Reported

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
MATAGORDA	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius: 1.25 miles
Status: Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

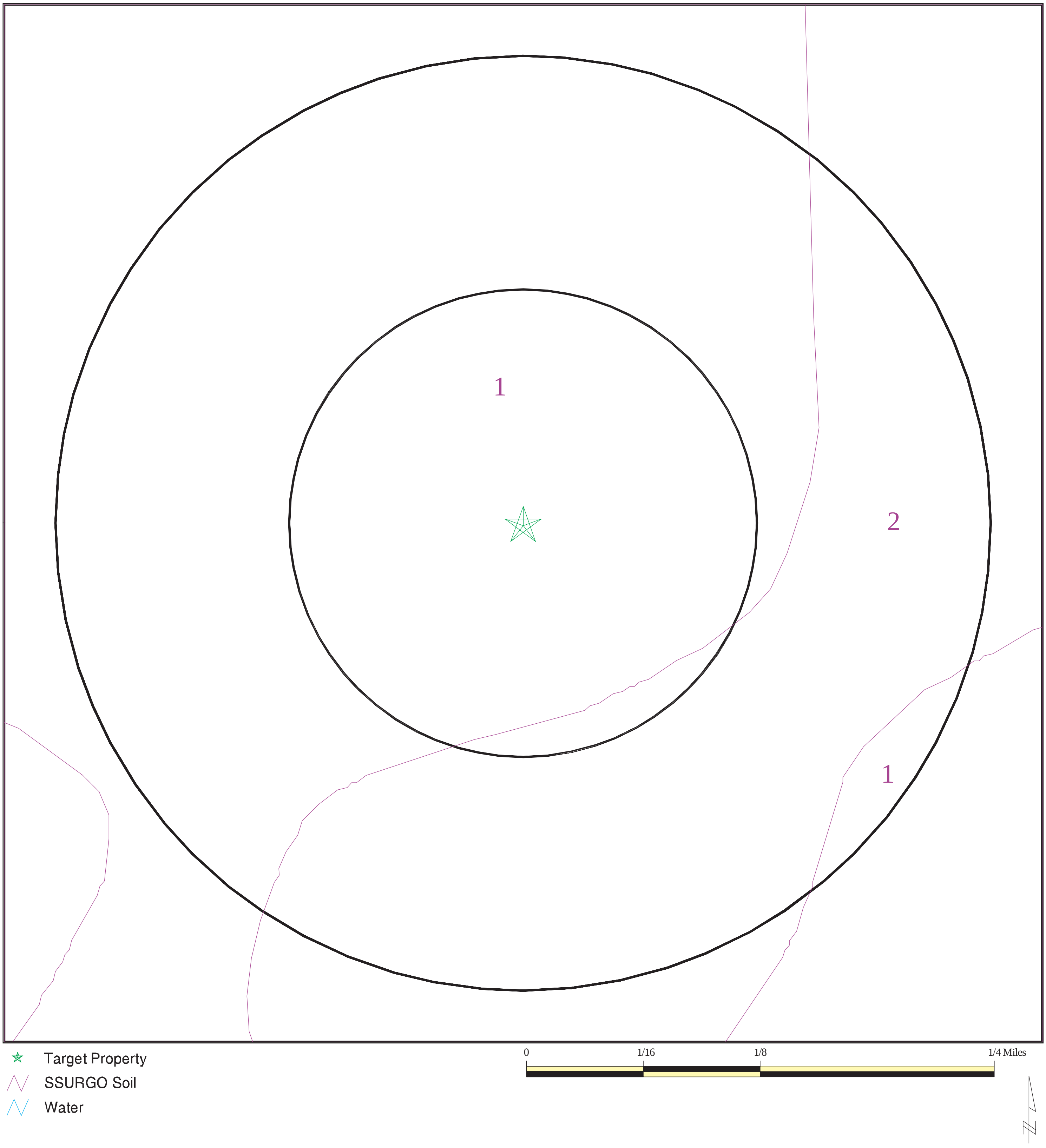
Era:	Cenozoic
System:	Quaternary
Series:	Pleistocene
Code:	Qp *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratifed Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 2284889.2s



SITE NAME: Tethered Aerostat Radar	CLIENT: Environmental Express Serv,EES
ADDRESS: Tethered Aerostat Radar Matagorda TX 77457	CONTACT: Jackie Baerwald INQUIRY #: 2284889.2s
LAT/LONG: 28.7106 / 95.9578	DATE: August 05, 2008 10:14 am

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Palacios

Soil Surface Texture: loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Poorly drained

Hydric Status: All hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 15 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	12 inches	loam	Not reported	Not reported	Max: 1.4 Min: 0.42	Max: 8.4 Min: 7.4
2	12 inches	25 inches	clay	Not reported	Not reported	Max: 1.4 Min: 0.42	Max: 8.4 Min: 7.4
3	25 inches	40 inches	clay	Not reported	Not reported	Max: 1.4 Min: 0.42	Max: 8.4 Min: 7.4
4	40 inches	61 inches	silty clay loam	Not reported	Not reported	Max: 1.4 Min: 0.42	Max: 8.4 Min: 7.4

Soil Map ID: 2

Soil Component Name: Livia

Soil Surface Texture: loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Poorly drained

Hydric Status: All hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 38 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	5 inches	loam	Not reported	Not reported	Max: 0.42 Min: 0.01	Max: 8.4 Min: 7.4
2	5 inches	46 inches	silty clay	Not reported	Not reported	Max: 0.42 Min: 0.01	Max: 8.4 Min: 7.4
3	46 inches	61 inches	silty clay	Not reported	Not reported	Max: 0.42 Min: 0.01	Max: 8.4 Min: 7.4
4	61 inches	79 inches	silty clay loam	Not reported	Not reported	Max: 0.42 Min: 0.01	Max: 8.4 Min: 7.4

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP

No Wells Found

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP

No PWS System Found

Note: PWS System location is not always the same as well location.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE DATABASE WELL INFORMATION

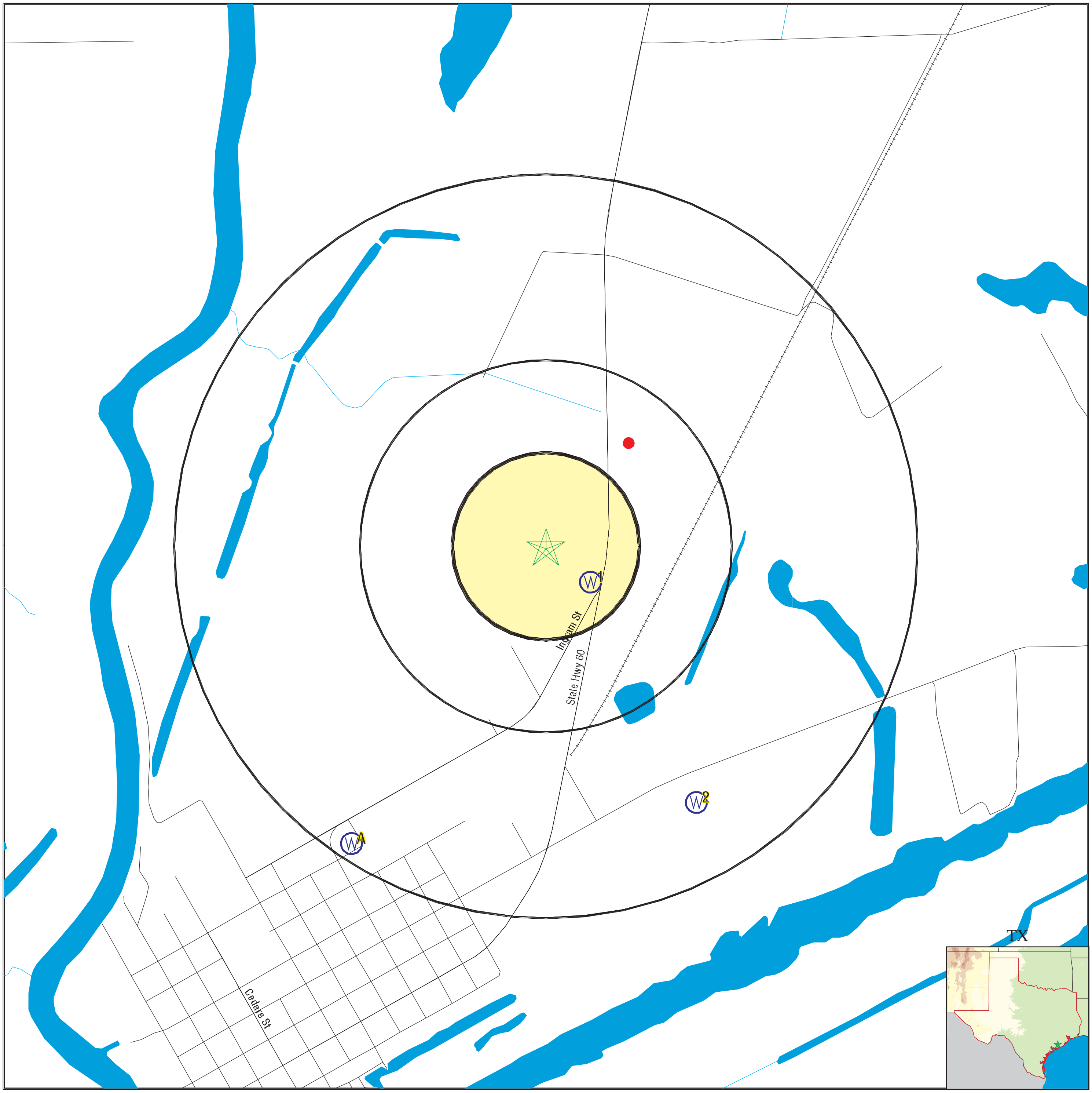
MAP ID	WELL ID	LOCATION FROM TP
1	TXWEQ1000001082	1/8 - 1/4 Mile SE
2	TXMON0000007360	1/2 - 1 Mile SSE
A3	TXWEQ1000001074	1/2 - 1 Mile SSW
A4	TXWDB2000009685	1/2 - 1 Mile SSW

OTHER STATE DATABASE INFORMATION

STATE OIL/GAS WELL INFORMATION

DISTANCE FROM TP (Miles)	DISTANCE FROM TP (Miles)
1/4 - 1/2 Mile NE	

PHYSICAL SETTING SOURCE MAP - 2284889.2s



County Boundary
Major Roads
Contour Lines
Earthquake epicenter, Richter 5 or greater
Water Wells
Public Water Supply Wells
Cluster of Multiple Icons

0 1/4 1/2 1 Miles

Groundwater Flow Direction
Indeterminate Groundwater Flow at Location
Groundwater Flow Varies at Location
Closest Hydrogeological Data
Oil or gas wells
(in certain Texas counties)

No contour lines were detected within this map area.

SITE NAME: Tethered Aerostat Radar ADDRESS: Tethered Aerostat Radar Matagorda TX 77457 LAT/LONG: 28.7106 / 95.9578	CLIENT: Environmental Express Serv,EES CONTACT: Jackie Baerwald INQUIRY #: 2284889.2s DATE: August 05, 2008 10:14 am

Map ID Direction Distance Elevation	Database	EDR ID Number
1 **SE** **1/8 - 1/4 Mile** **Higher**	**TX WELLS**	**TXWEQ1000001082**

Database:	Public Water Supply Sources Database		
Pws id:	1610121	Water sour:	G1610121A
Fips count:	321	Quadrangle:	2895-323
Latitude:	284232		
Longitude:	955720		
Location a:	G	Agency:	TNRCC
Location m:	MAP-D1	Horizontal:	27
Spatial re:	C	Horizont 1:	U
Horizont 2:	S	Elevation:	7
Elevation :	D	Vertical d:	29
Location d:	01/01/1901 00:00:00	Elevation1:	05/08/2007 00:00:00
Elevatio 1:	TCEQ	Elevatio 2:	G
Latdd:	28.7088890076		
Longdd:	-95.9555587769		
Gps certif:	Not Reported	Need bette:	Not Reported
Last chang:	07/28/1997 00:00:00	Initials:	Not Reported
Remarks:	Not Reported		
Site id:	TXWEQ1000001082		

Groundwater Information:

Pws id:	1610121	Water source:	G1610121A
Well depth:	691	Depth agency:	TNRCC
Depth source:	U	Aquifer:	112CHCT
Aquifer id:	31		
Aquifer name:	CHICOT		
Aquifer method:	D	Aquifer type:	Not Reported
Drill date:	99999999	Last change:	07/28/1997 00:00:00
Initials:	Not Reported		
Remarks:	Not Reported		

PWS Location Information:

Pws id:	1610121	Water source:	G1610121A
Fips county code:	321	Quadrangle number:	2895-323
Latitude:	284232		
Longitude:	955720		
Location accuracy:	G	Agency:	TNRCC
Location method:	MAP-D1	Horizontal datum:	27
Spatial reference code:	C	Horizontal accuracy:	U
Horizontal reference:	S	Elevation:	7
Elevation method:	D	Vertical datum:	29
Location date:	Not Reported	Elevation date:	05/08/2007 00:00:00
Elevation agency:	TCEQ	Elevation accuracy:	G
Latdd:	28.7088890075684		
Longdd:	95.9555587768555		
Gps certification number:	Not Reported	Need better location:	Not Reported
Last change:	07/28/1997 00:00:00	Initials:	Not Reported
Remarks:	Not Reported		

Well Construction Information:

Pws id:	1610121	Water source:	G1610121A
Record number:	2	Well interval:	OPENING INTERVAL
Top depth:	671	Bottom depth:	691
Depth positive:	Not Reported	Diameter:	0
Opening type:	U	Casing material:	Not Reported
Opening material:	U	Opening length:	20
Opening method:	8	Packer material:	Not Reported
Initials:	JEM	Last change:	01/28/2002 00:00:00

2
SSE
1/2 - 1 Mile
Higher

TX WELLS **TXMON0000007360**

Trackno:	30645	Dateentere:	01/07/2004 00:00:00
Ownname:	Talasek Builders		
Ownstreet:	Austin Rd		
Owncity:	Matagorda	Ownstate:	TX
Ownzip:	77457	County:	Brazoria
Wellstreet:	Not Reported		
Wellcity:	Not Reported	Wellzip:	77457
Owners well #:	Not Reported	Latitude:	284202
Lat dec:	28.700555		
Longitude:	955704		
Long dec:	-95.951111		
Elevation:	0	GPS Brand used:	garmon
Grid #:	81175	1 Degree Grid:	81
7.5 minute Grid:	17	2.5 minute Grid:	5
Is new well:	1	Is well deepening:	0
Is Reconditioned:	0	Is Replacement:	0
Is rig supply:	0	Is Monitor well:	0
Is Soil Boring:	0	Is Domestic well:	0
Is Industrial well:	0	Is Irrigation well:	1
Is Geothermal well:	0	Is Injection well:	0
Is Public supply:	0	Is Dewatering:	0
Is Test well:	0	Is Stock well:	0
Plan approved Yes:	0	Plan approved No:	0
Const. Start date:	10/08/2003 00:00:00	Const. End date:	10/11/2003 00:00:00
Hole 1 Diameter:	8	Diam to Depth 1:	200
Hole 2 Diameter:	5	Diam from depth 2:	200
Diam to depth 2:	440	Hole 3 diameter:	Not Reported
Diam from depth 3:	Not Reported	Diam to depth 3:	Not Reported
Formation material:	0-10-top soil 10-60-sand 60-120-red clay 120-170-sand 170-310-blue clay 310-325-sand 325-405-blue clay 405-435-sand 435-440-blue clay		
Drilling Method Driven:	0	Drilling Method Rotary:	0
Drill Meth - Mud Rotary:	1	Drill Meth - Bored:	0
Drill Meth - Air Hammer:	0	Drill Meth - Cable tool:	0
Drill Meth - Jetted:	0	Drill Meth - Auger:	0
Drill Meth - Rev Circ:	0	Drill Meth - Other check:	0
Drill Meth - other explained:	Not Reported	Borehole Compl Open hole:	0
B/H Compl Straight wall:	1	Borehole Gravel Packed:	0
Borehole Gravel size:	Not Reported	Borehole underreamed:	0
Borehole Other Checked:	0	Borehole Other Explained:	Not Reported
Gravel Packed from depth:	Not Reported	Gravel Packed to depth:	Not Reported
Casing Screen:	4 n pvc 0-200 40 2 n pvc 200-420 40 2 n pvc sch 40 420-430 .006 2 n		

Cement data from 1:	0	Cement to 1:	100
Num Cement sacks 1:	18	Cement data from 2:	Not Reported
Cement to 2:	Not Reported	Num Cement sacks 2:	Not Reported
Cement data from 3:	Not Reported	Cement data to 3:	Not Reported
Num cement sacks 3:	Not Reported	Cement method used:	trimie
Cementer Name:	driller	Dist. to Septic System:	60
Dist. to Prop Line:	50	Dist. to Septic Verif:	tape
Approved by variance:	Not Reported	Surf. completion slab:	0
Surf. steel sleeve:	1	Surf. pitless adapter:	0
Approved Alt Proc:	0	Water level:	70
Measurement date:	10/11/2003 00:00:00	Flow gal/min:	0
Packers Desc:	1 rubber	20 1 rubber	405
Well plugged?:	0		
Plugging Info:	Not Reported		
Has Pump Turbine:	0	Has Pump Jet:	0
Has Pump Submers:	1	Has Pump Cylinder:	0
Has Pump Other Check:	0	Pump Type Descr:	Not Reported
Pump bowl depth:	147	Test Pump:	0
Test bailer:	0	Test jetted:	1
Test estimated:	0	Well test yield:	40
Test drawdown:	0	Test Hours:	0
Undesireable WQ Yes:	0	Undesireable WQ No:	1
Water type:	fresh	Depth of Strata:	30
Chem analysis Yes:	0	Chem analysis No:	1
Undesire natural:	0	Natural type:	Not Reported
Has hydrocarbon:	0	Has Haz Waste:	0
Has Other Check:	0		
Undesireable Descr:	Not Reported		
Undesireable Certified:	0	Company name:	Finch Water Well
Driller license:	2405	Street Address:	p.o. box 508
Company city:	Sweeny	Company state:	TX
Company zip:	77480	Driller name:	John F. Finch
Trainee name:	Not Reported	Trainee Reg #:	Not Reported
Comments:	Not Reported		

A3
SSW
1/2 - 1 Mile
Higher

TX WELLS **TXWEQ1000001074**

Database:	Public Water Supply Sources Database		
Pws id:	1610013	Water sour:	G1610013B
Fips count:	321	Quadrangle:	2895-323
Latitude:	284156.46875		
Longitude:	955758.9375		
Location a:	Not Reported	Agency:	TCEQ
Location m:	GPS-S	Horizontal:	83
Spatial re:	T	Horizont 1:	I
Horizont 2:	S	Elevation:	6
Elevation :	D	Vertical d:	29
Location d:	11/01/2006 00:00:00	Elevation1:	05/08/2007 00:00:00
Elevatio 1:	TCEQ	Elevatio 2:	G
Latdd:	28.6990203857		
Longdd:	-95.9663772583		
Gps certif:	01112901	Need bette:	No
Last chang:	08/26/2004 00:00:00	Initials:	DPT
Remarks:	Not Reported		
Site id:	TXWEQ1000001074		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Groundwater Information:

Pws id:	1610013	Water source:	G1610013B
Well depth:	795	Depth agency:	DRILL
Depth source:	D	Aquifer:	112CHCT
Aquifer id:	31		
Aquifer name:	CHICOT		
Aquifer method:	S	Aquifer type:	1
Drill date:	19841009	Last change:	11/01/2006 00:00:00
Initials:	RWA		
Remarks:	Not Reported		

PWS Location Information:

Pws id:	1610013	Water source:	G1610013B
Fips county code:	321	Quadrangle number:	2895-323
Latitude:	284156.46875		
Longitude:	955758.9375		
Location accuracy:	Not Reported	Agency:	TCEQ
Location method:	GPS-S	Horizontal datum:	83
Spatial reference code:	T	Horizontal accuracy:	I
Horizontal reference:	S	Elevation:	6
Elevation method:	D	Vertical datum:	29
Location date:	Not Reported	Elevation date:	05/08/2007 00:00:00
Elevation agency:	TCEQ	Elevation accuracy:	G
Latdd:	28.6990203857422		
Longdd:	95.9663772583008		
Gps certification number:	01112901	Need better location:	No
Last change:	08/26/2004 00:00:00	Initials:	DPT
Remarks:	Not Reported		

Well Construction Information:

Pws id:	1610013	Water source:	G1610013B
Record number:	4	Well interval:	WELL OPENINGS
Top depth:	654	Bottom depth:	690
Depth positive:	Not Reported	Diameter:	0
Opening type:	S	Casing material:	Not Reported
Opening material:	U	Opening length:	36
Opening method:	Not Reported	Packer material:	Not Reported
Initials:	MTM	Last change:	11/18/2002 00:00:00

Pws id:	1610013	Water source:	G1610013B
Record number:	5	Well interval:	CASING
Top depth:	690	Bottom depth:	754
Depth positive:	Not Reported	Diameter:	0
Opening type:	Not Reported	Casing material:	U
Opening material:	Not Reported	Opening length:	Not Reported
Opening method:	Not Reported	Packer material:	Not Reported
Initials:	MTM	Last change:	11/18/2002 00:00:00

Pws id:	1610013	Water source:	G1610013B
Record number:	6	Well interval:	WELL OPENINGS
Top depth:	754	Bottom depth:	784
Depth positive:	Not Reported	Diameter:	0
Opening type:	S	Casing material:	Not Reported
Opening material:	U	Opening length:	30
Opening method:	Not Reported	Packer material:	Not Reported
Initials:	MTM	Last change:	11/18/2002 00:00:00

Pws id:	1610013	Water source:	G1610013B
Record number:	7	Well interval:	CASING
Top depth:	784	Bottom depth:	795
Depth positive:	Not Reported	Diameter:	0
Opening type:	Not Reported	Casing material:	U
Opening material:	Not Reported	Opening length:	Not Reported
Opening method:	Not Reported	Packer material:	Not Reported
Initials:	MTM	Last change:	11/18/2002 00:00:00

Pws id:	1610013	Water source:	G1610013B
Record number:	1	Well interval:	ANNULAR CEMENT
Top depth:	0	Bottom depth:	650
Depth positive:	Not Reported	Diameter:	0
Opening type:	Not Reported	Casing material:	Not Reported
Opening material:	Not Reported	Opening length:	Not Reported
Opening method:	Not Reported	Packer material:	Not Reported
Initials:	MTM	Last change:	11/18/2002 00:00:00

Pws id:	1610013	Water source:	G1610013B
Record number:	2	Well interval:	CASING
Top depth:	0	Bottom depth:	650
Depth positive:	Not Reported	Diameter:	10.75
Opening type:	Not Reported	Casing material:	U
Opening material:	Not Reported	Opening length:	Not Reported
Opening method:	Not Reported	Packer material:	Not Reported
Initials:	RWA	Last change:	11/01/2006 00:00:00

Pws id:	1610013	Water source:	G1610013B
Record number:	3	Well interval:	CASING
Top depth:	650	Bottom depth:	654
Depth positive:	Not Reported	Diameter:	0
Opening type:	Not Reported	Casing material:	U
Opening material:	Not Reported	Opening length:	Not Reported
Opening method:	Not Reported	Packer material:	Not Reported
Initials:	MTM	Last change:	11/18/2002 00:00:00

Well Geology Information:

Pws id:	1610013	Water source:	G1610013B
Record number:	1	Top depth:	0
Bottom depth:	3	Thickness:	3
Geologic description:	TOP SOIL		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	2	Top depth:	3
Bottom depth:	13	Thickness:	10
Geologic description:	CLAY		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	3	Top depth:	13
Bottom depth:	42	Thickness:	29
Geologic description:	SAND		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	4	Top depth:	42
Bottom depth:	61	Thickness:	19
Geologic description:	CLAY		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	5	Top depth:	61
Bottom depth:	82	Thickness:	21
Geologic description:	SAND		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	6	Top depth:	82
Bottom depth:	172	Thickness:	90
Geologic description:	CLAY		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	7	Top depth:	172
Bottom depth:	182	Thickness:	10
Geologic description:	SAND		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	8	Top depth:	182
Bottom depth:	202	Thickness:	20
Geologic description:	CLAY		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	9	Top depth:	202
Bottom depth:	223	Thickness:	21
Geologic description:	SAND		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	10	Top depth:	223
Bottom depth:	259	Thickness:	36
Geologic description:	CLAY		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	11	Top depth:	259
Bottom depth:	264	Thickness:	5
Geologic description:	SAND		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	12	Top depth:	264
Bottom depth:	368	Thickness:	104
Geologic description:	CLAY		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	13	Top depth:	368
Bottom depth:	386	Thickness:	18
Geologic description:	SAND		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	14	Top depth:	386
Bottom depth:	423	Thickness:	37
Geologic description:	CLAY		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	15	Top depth:	423
Bottom depth:	435	Thickness:	12
Geologic description:	SAND		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	16	Top depth:	435
Bottom depth:	442	Thickness:	7
Geologic description:	CLAY		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	17	Top depth:	442
Bottom depth:	465	Thickness:	23
Geologic description:	SAND		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	18	Top depth:	465
Bottom depth:	539	Thickness:	74
Geologic description:	CLAY		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	19	Top depth:	539
Bottom depth:	554	Thickness:	15
Geologic description:	SAND		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	20	Top depth:	554
Bottom depth:	598	Thickness:	44
Geologic description:	CLAY		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	21	Top depth:	598
Bottom depth:	610	Thickness:	12
Geologic description:	SAND		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	22	Top depth:	610
Bottom depth:	651	Thickness:	41
Geologic description:	CLAY		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	23	Top depth:	651
Bottom depth:	692	Thickness:	41
Geologic description:	SAND		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	24	Top depth:	692
Bottom depth:	752	Thickness:	60
Geologic description:	CLAY		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	25	Top depth:	752
Bottom depth:	786	Thickness:	34
Geologic description:	SAND		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

Pws id:	1610013	Water source:	G1610013B
Record number:	26	Top depth:	786
Bottom depth:	796	Thickness:	10
Geologic description:	CLAY		
Geologic correction:	Not Reported		
Source geologic data:	7	Initials:	MTM
Last change:	11/18/2002 00:00:00		
Remarks:	Not Reported		

A4
SSW
1/2 - 1 Mile
Higher

TX WELLS **TXWDB2000009685**

State well:	8117406	County cod:	Matagorda
Basin:	14	Zone:	3
Region num:	9	Previous w:	Not Reported
Latitude:	284156		
Lat dec:	28.698888		
Longitude:	955759		
Long dec:	-95.966388		
Owner 1:	Matagorda WSC	Owner 2:	Well #2
Driller 1:	O'Day Drilling	Driller 2:	Co., Inc.
Source of:	0		
Aquifer:	Not Reported		
Aquifer id:	15	Aquifer 1:	0
Aquifer 2:	0	Elev of ls:	5
Meth of me:	M	User code:	542300
Date drill:	08081984	Well type:	W
Well depth:	796	Source of1:	D
Type of li:	T	Type of po:	E
Horsepower:	Not Reported	Primary wa:	P
Second wat:	Not Reported	Tertia wat:	Not Reported
Water leve:	N	Water qual:	Y
Well logs:	Not Reported	Other data:	Not Reported
Date coll:	06121997	Reporting:	01
Well sched:	Y	Construct:	Not Reported
Completion:	Not Reported	Casing mat:	Not Reported
Screen mat:	Not Reported	Todays dat:	08/26/2005 00:00:00
User name:	drjones	Site id:	TXWDB2000009685

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	00010
Flag:	Not Reported	Const val:	29.0
Plus minus:	Not Reported		
Storet code:	00010	Constit name:	WATER
Long Description:	TEMPERATURE, WATER (CELSIUS)		
Short description:	TEMP		
Units of measure:	C		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	00010
Flag:	Not Reported	Const val:	28.2
Plus minus:	Not Reported		
Storet code:	00010	Constit name:	WATER
Long Description:	TEMPERATURE, WATER (CELSIUS)		
Short description:	TEMP		
Units of measure:	C		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	00010
Flag:	Not Reported	Const val:	28.1
Plus minus:	Not Reported		
Storet code:	00010	Constit name:	WATER
Long Description:	TEMPERATURE, WATER (CELSIUS)		
Short description:	TEMP		
Units of measure:	C		

State well number:	8117406	Mm date:	10
Dd date:	20	Yy date:	1992
Sample number:	1	Storet code:	00090
Flag:	Not Reported	Const val:	0.9
Plus minus:	Not Reported		
Storet code:	00090	Constit name:	REDOX
Long Description:	OXIDATION REDUCTION POTENTIAL (ORP), MILLIVOLTS		
Short description:	POTENTAL		
Units of measure:	MV		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	00090
Flag:	Not Reported	Const val:	-173.4
Plus minus:	Not Reported		
Storet code:	00090	Constit name:	REDOX
Long Description:	OXIDATION REDUCTION POTENTIAL (ORP), MILLIVOLTS		
Short description:	POTENTAL		
Units of measure:	MV		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	00608
Flag:	Not Reported	Const val:	0.2
Plus minus:	Not Reported		
Storet code:	00608	Constit name:	NH3-N
Long Description:	NITROGEN, AMMONIA, DISSOLVED (MG/L AS N)		
Short description:	DISS		
Units of measure:	MG/L		

State well number:	8117406	Mm date:	10
Dd date:	20	Yy date:	1992
Sample number:	1	Storet code:	00618
Flag:	Not Reported	Const val:	0.80
Plus minus:	Not Reported		
Storet code:	00618	Constit name:	NO3-N
Long Description:	NITRATE NITROGEN, DISSOLVED (MG/L AS N)		
Short description:	DISS		
Units of measure:	MG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	00623
Flag:	Not Reported	Const val:	0.43
Plus minus:	Not Reported		
Storet code:	00623	Constit name:	KJELDL
Long Description:	NITROGEN, KJELDAHL, DISSOLVED (MG/L AS N)		
Short description:	DISS N		
Units of measure:	MG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	00631
Flag:	<	Const val:	0.04
Plus minus:	Not Reported		
Storet code:	00631	Constit name:	NO2+NO3
Long Description:	NITRITE PLUS NITRATE, DISSOLVED (MG/L AS N)		
Short description:	N- DISS		
Units of measure:	MG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	00631
Flag:	<	Const val:	0.02
Plus minus:	Not Reported		
Storet code:	00631	Constit name:	NO2+NO3
Long Description:	NITRITE PLUS NITRATE, DISSOLVED (MG/L AS N)		
Short description:	N- DISS		
Units of measure:	MG/L		

State well number:	8117406	Mm date:	10
Dd date:	20	Yy date:	1992
Sample number:	1	Storet code:	00671
Flag:	Not Reported	Const val:	0.32
Plus minus:	Not Reported		
Storet code:	00671	Constit name:	PHOS-DIS
Long Description:	PHOSPHORUS, DISSOLVED ORTHOPHOSPHATE (MG/L AS P)		
Short description:	ORTHO P		
Units of measure:	MG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01000
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01000	Constit name:	ARSENIC
Long Description:	ARSENIC, DISSOLVED (UG/L AS AS)		
Short description:	AS,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01000
Flag:	<	Const val:	1.5
Plus minus:	Not Reported		
Storet code:	01000	Constit name:	ARSENIC
Long Description:	ARSENIC, DISSOLVED (UG/L AS AS)		
Short description:	AS,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01000
Flag:	<	Const val:	2
Plus minus:	Not Reported		
Storet code:	01000	Constit name:	ARSENIC
Long Description:	ARSENIC, DISSOLVED (UG/L AS AS)		
Short description:	AS,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01005
Flag:	Not Reported	Const val:	119
Plus minus:	Not Reported		
Storet code:	01005	Constit name:	BARIUM
Long Description:	BARIUM, DISSOLVED (UG/L AS BA)		
Short description:	BA,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01005
Flag:	Not Reported	Const val:	105
Plus minus:	Not Reported		
Storet code:	01005	Constit name:	BARIUM
Long Description:	BARIUM, DISSOLVED (UG/L AS BA)		
Short description:	BA,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01005
Flag:	Not Reported	Const val:	96.0
Plus minus:	Not Reported		
Storet code:	01005	Constit name:	BARIUM
Long Description:	BARIUM, DISSOLVED (UG/L AS BA)		
Short description:	BA,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01010
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01010	Constit name:	BERYLIUM
Long Description:	BERYLLIUM, DISSOLVED (UG/L AS BE)		
Short description:	BE,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01010
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01010	Constit name:	BERYLIUM
Long Description:	BERYLLIUM, DISSOLVED (UG/L AS BE)		
Short description:	BE,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01010
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01010	Constit name:	BERYLIUM
Long Description:	BERYLLIUM, DISSOLVED (UG/L AS BE)		
Short description:	BE,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01020
Flag:	Not Reported	Const val:	408
Plus minus:	Not Reported		
Storet code:	01020	Constit name:	BORON
Long Description:	BORON, DISSOLVED (UG/L AS B)		
Short description:	B,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01020
Flag:	Not Reported	Const val:	388
Plus minus:	Not Reported		
Storet code:	01020	Constit name:	BORON
Long Description:	BORON, DISSOLVED (UG/L AS B)		
Short description:	B,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01020
Flag:	Not Reported	Const val:	451
Plus minus:	Not Reported		
Storet code:	01020	Constit name:	BORON
Long Description:	BORON, DISSOLVED (UG/L AS B)		
Short description:	B,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01025
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01025	Constit name:	CADMIUM
Long Description:	CADMIUM, DISSOLVED (UG/L AS CD)		
Short description:	CD,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01025
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01025	Constit name:	CADMIUM
Long Description:	CADMIUM, DISSOLVED (UG/L AS CD)		
Short description:	CD,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01030
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01030	Constit name:	CHROMIUM
Long Description:	CHROMIUM, DISSOLVED (UG/L AS CR)		
Short description:	CR,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01030
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01030	Constit name:	CHROMIUM
Long Description:	CHROMIUM, DISSOLVED (UG/L AS CR)		
Short description:	CR,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01035
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01035	Constit name:	COBALT
Long Description:	COBALT, DISSOLVED (UG/L AS CO)		
Short description:	CO,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01035
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01035	Constit name:	COBALT
Long Description:	COBALT, DISSOLVED (UG/L AS CO)		
Short description:	CO,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01035
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01035	Constit name:	COBALT
Long Description:	COBALT, DISSOLVED (UG/L AS CO)		
Short description:	CO,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01040
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01040	Constit name:	COPPER
Long Description:	COPPER, DISSOLVED (UG/L AS CU)		
Short description:	CU,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01040
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01040	Constit name:	COPPER
Long Description:	COPPER, DISSOLVED (UG/L AS CU)		
Short description:	CU,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01040
Flag:	Not Reported	Const val:	2.20
Plus minus:	Not Reported		
Storet code:	01040	Constit name:	COPPER
Long Description:	COPPER, DISSOLVED (UG/L AS CU)		
Short description:	CU,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	10
Dd date:	20	Yy date:	1992
Sample number:	1	Storet code:	01046
Flag:	Not Reported	Const val:	10.00
Plus minus:	Not Reported		
Storet code:	01046	Constit name:	IRON
Long Description:	IRON, DISSOLVED (UG/L AS FE)		
Short description:	FE,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01046
Flag:	<	Const val:	30
Plus minus:	Not Reported		
Storet code:	01046	Constit name:	IRON
Long Description:	IRON, DISSOLVED (UG/L AS FE)		
Short description:	FE,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01046
Flag:	Not Reported	Const val:	30.7
Plus minus:	Not Reported		
Storet code:	01046	Constit name:	IRON
Long Description:	IRON, DISSOLVED (UG/L AS FE)		
Short description:	FE,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01046
Flag:	<	Const val:	51
Plus minus:	Not Reported		
Storet code:	01046	Constit name:	IRON
Long Description:	IRON, DISSOLVED (UG/L AS FE)		
Short description:	FE,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01049
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01049	Constit name:	LEAD
Long Description:	LEAD, DISSOLVED (UG/L AS PB)		
Short description:	PB,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01049
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01049	Constit name:	LEAD
Long Description:	LEAD, DISSOLVED (UG/L AS PB)		
Short description:	PB,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01049
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01049	Constit name:	LEAD
Long Description:	LEAD, DISSOLVED (UG/L AS PB)		
Short description:	PB,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01056
Flag:	Not Reported	Const val:	11
Plus minus:	Not Reported		
Storet code:	01056	Constit name:	MANGNESE
Long Description:	MANGANESE, DISSOLVED (UG/L AS MN)		
Short description:	MN,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01056
Flag:	Not Reported	Const val:	6.5
Plus minus:	Not Reported		
Storet code:	01056	Constit name:	MANGNESE
Long Description:	MANGANESE, DISSOLVED (UG/L AS MN)		
Short description:	MN,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01056
Flag:	Not Reported	Const val:	8.30
Plus minus:	Not Reported		
Storet code:	01056	Constit name:	MANGNESE
Long Description:	MANGANESE, DISSOLVED (UG/L AS MN)		
Short description:	MN,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01057
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01057	Constit name:	THALLIUM
Long Description:	THALLIUM, DISSOLVED (UG/L AS TL)		
Short description:	TL,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01057
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01057	Constit name:	THALLIUM
Long Description:	THALLIUM, DISSOLVED (UG/L AS TL)		
Short description:	TL,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01057
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01057	Constit name:	THALLIUM
Long Description:	THALLIUM, DISSOLVED (UG/L AS TL)		
Short description:	TL,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01060
Flag:	Not Reported	Const val:	10
Plus minus:	Not Reported		
Storet code:	01060	Constit name:	MOLY
Long Description:	MOLYBDENUM, DISSOLVED, UG/L		
Short description:	DISSOLVE		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01060
Flag:	Not Reported	Const val:	6.7
Plus minus:	Not Reported		
Storet code:	01060	Constit name:	MOLY
Long Description:	MOLYBDENUM, DISSOLVED, UG/L		
Short description:	DISSOLVE		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01060
Flag:	Not Reported	Const val:	8.07
Plus minus:	Not Reported		
Storet code:	01060	Constit name:	MOLY
Long Description:	MOLYBDENUM, DISSOLVED, UG/L		
Short description:	DISSOLVE		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01065
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01065	Constit name:	NICKEL
Long Description:	NICKEL, DISSOLVED (UG/L AS NI)		
Short description:	NI,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01065
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01065	Constit name:	NICKEL
Long Description:	NICKEL, DISSOLVED (UG/L AS NI)		
Short description:	NI,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01080
Flag:	Not Reported	Const val:	110
Plus minus:	Not Reported		
Storet code:	01080	Constit name:	STRONTUM
Long Description:	STRONTIUM, DISSOLVED (UG/L AS SR)		
Short description:	SR,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01080
Flag:	Not Reported	Const val:	104
Plus minus:	Not Reported		
Storet code:	01080	Constit name:	STRONTUM
Long Description:	STRONTIUM, DISSOLVED (UG/L AS SR)		
Short description:	SR,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01080
Flag:	Not Reported	Const val:	83.3
Plus minus:	Not Reported		
Storet code:	01080	Constit name:	STRONTUM
Long Description:	STRONTIUM, DISSOLVED (UG/L AS SR)		
Short description:	SR,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01085
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01085	Constit name:	VANADIUM
Long Description:	VANADIUM, DISSOLVED (UG/L AS V)		
Short description:	V,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01085
Flag:	Not Reported	Const val:	11.1
Plus minus:	Not Reported		
Storet code:	01085	Constit name:	VANADIUM
Long Description:	VANADIUM, DISSOLVED (UG/L AS V)		
Short description:	V,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01085
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01085	Constit name:	VANADIUM
Long Description:	VANADIUM, DISSOLVED (UG/L AS V)		
Short description:	V,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01090
Flag:	Not Reported	Const val:	3
Plus minus:	Not Reported		
Storet code:	01090	Constit name:	ZINC
Long Description:	ZINC, DISSOLVED (UG/L AS ZN)		
Short description:	ZN,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01090
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01090	Constit name:	ZINC
Long Description:	ZINC, DISSOLVED (UG/L AS ZN)		
Short description:	ZN,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01090
Flag:	<	Const val:	4
Plus minus:	Not Reported		
Storet code:	01090	Constit name:	ZINC
Long Description:	ZINC, DISSOLVED (UG/L AS ZN)		
Short description:	ZN,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01095
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01095	Constit name:	ANTIMONY
Long Description:	ANTIMONY, DISSOLVED (UG/L AS SB)		
Short description:	SD,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01095
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01095	Constit name:	ANTIMONY
Long Description:	ANTIMONY, DISSOLVED (UG/L AS SB)		
Short description:	SD,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01095
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01095	Constit name:	ANTIMONY
Long Description:	ANTIMONY, DISSOLVED (UG/L AS SB)		
Short description:	SD,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01106
Flag:	Not Reported	Const val:	3
Plus minus:	Not Reported		
Storet code:	01106	Constit name:	ALUMINUM
Long Description:	ALUMINUM, DISSOLVED (UG/L AS AL)		
Short description:	AL, DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01106
Flag:	<	Const val:	1.5
Plus minus:	Not Reported		
Storet code:	01106	Constit name:	ALUMINUM
Long Description:	ALUMINUM, DISSOLVED (UG/L AS AL)		
Short description:	AL, DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01106
Flag:	<	Const val:	4
Plus minus:	Not Reported		
Storet code:	01106	Constit name:	ALUMINUM
Long Description:	ALUMINUM, DISSOLVED (UG/L AS AL)		
Short description:	AL, DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01130
Flag:	<	Const val:	100
Plus minus:	Not Reported		
Storet code:	01130	Constit name:	LITHIUM
Long Description:	LITHIUM, DISSOLVED (UG/L AS LI)		
Short description:	LI,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01130
Flag:	Not Reported	Const val:	11.8
Plus minus:	Not Reported		
Storet code:	01130	Constit name:	LITHIUM
Long Description:	LITHIUM, DISSOLVED (UG/L AS LI)		
Short description:	LI,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01130
Flag:	Not Reported	Const val:	14.1
Plus minus:	Not Reported		
Storet code:	01130	Constit name:	LITHIUM
Long Description:	LITHIUM, DISSOLVED (UG/L AS LI)		
Short description:	LI,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01145
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	01145	Constit name:	SELENIUM
Long Description:	SELENIUM, DISSOLVED (UG/L AS SE)		
Short description:	SE,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	01145
Flag:	<	Const val:	6
Plus minus:	Not Reported		
Storet code:	01145	Constit name:	SELENIUM
Long Description:	SELENIUM, DISSOLVED (UG/L AS SE)		
Short description:	SE,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	01145
Flag:	<	Const val:	4
Plus minus:	Not Reported		
Storet code:	01145	Constit name:	SELENIUM
Long Description:	SELENIUM, DISSOLVED (UG/L AS SE)		
Short description:	SE,DISS		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	01503
Flag:	<	Const val:	1.0
Plus minus:	Not Reported		
Storet code:	01503	Constit name:	ALPHA
Long Description:	ALPHA, DISSOLVED, PC/L		
Short description:	DISOLVED		
Units of measure:	PC/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	03503
Flag:	<	Const val:	2.0
Plus minus:	Not Reported		
Storet code:	03503	Constit name:	BETA
Long Description:	BETA, DISSOLVED, PC/L		
Short description:	DISOLVED		
Units of measure:	PC/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	04241
Flag:	Not Reported	Const val:	0.7
Plus minus:	1.2		
Storet code:	04241	Constit name:	ALPHA
Long Description:	GROSS ALPHA RADIATION, TOTAL, PRODUCED WATER,pCi/L		
Short description:	GRSSALPH		
Units of measure:	Not Reported		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	04242
Flag:	Not Reported	Const val:	2.6
Plus minus:	2.2		
Storet code:	04242	Constit name:	BETA
Long Description:	GROSS BETA RADIATION, TOTAL, PRODUCED WATER, pCi/L		
Short description:	GRSSBETA		
Units of measure:	Not Reported		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	22703
Flag:	<	Const val:	1
Plus minus:	Not Reported		
Storet code:	22703	Constit name:	U-NAT
Long Description:	URANIUM, NATURAL, DISSOLVED, UG/L		
Short description:	DISSOLVE		
Units of measure:	UG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	71865
Flag:	<	Const val:	0.15
Plus minus:	Not Reported		
Storet code:	71865	Constit name:	IODIDE
Long Description:	IODIDE (MG/L AS I)		
Short description:	I		
Units of measure:	MG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	71870
Flag:	Not Reported	Const val:	0.82
Plus minus:	Not Reported		
Storet code:	71870	Constit name:	BROMIDE
Long Description:	BROMIDE, DISSOLVED, (MG/L AS BR)		
Short description:	DISSOLVE		
Units of measure:	MG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	71870
Flag:	Not Reported	Const val:	0.629
Plus minus:	Not Reported		
Storet code:	71870	Constit name:	BROMIDE
Long Description:	BROMIDE, DISSOLVED, (MG/L AS BR)		
Short description:	DISSOLVE		
Units of measure:	MG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	82244
Flag:	Not Reported	Const val:	6.0
Plus minus:	Not Reported		
Storet code:	82244	Constit name:	ALKALIN
Long Description:	ALKALINITY PHENOLPHTHALEIN FIELD DATA (MG/L)		
Short description:	FLD DATA		
Units of measure:	MG/L		

State well number:	8117406	Mm date:	8
Dd date:	18	Yy date:	2005
Sample number:	1	Storet code:	39086
Flag:	Not Reported	Const val:	374
Plus minus:	Not Reported		
Storet code:	39086	Constit name:	ALKLNITY
Long Description:	ALKALINITY, FIELD, DISSOLVED AS CACO3		
Short description:	FLD DISS		
Units of measure:	MG/L		

State well number:	8117406	Mm date:	6
Dd date:	12	Yy date:	1997
Sample number:	1	Storet code:	39086
Flag:	Not Reported	Const val:	384.0
Plus minus:	Not Reported		
Storet code:	39086	Constit name:	ALKLNITY
Long Description:	ALKALINITY, FIELD, DISSOLVED AS CACO3		
Short description:	FLD DISS		
Units of measure:	MG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yy date:	2001
Sample number:	1	Storet code:	39086
Flag:	Not Reported	Const val:	378
Plus minus:	Not Reported		
Storet code:	39086	Constit name:	ALKLNITY
Long Description:	ALKALINITY, FIELD, DISSOLVED AS CACO3		
Short description:	FLD DISS		
Units of measure:	MG/L		

State well number:	8117406	Mm date:	5
Dd date:	8	Yydate:	2001
Sample number:	1	Sample time:	0920
Temp centigrade:	28	Top s interval:	Not Reported
Bottom s interval:	Not Reported	Samp int aqcode:	Not Reported
Collection remarks:	Not Reported	Reliability rem:	10
Collecting agency:	01	Lab code:	23
Bu wqanalysis:	B	Q00955 flag:	Not Reported
Q00955 silica mgl:	14.6	Q00910 flag:	Not Reported
Q00910 calcium mgl:	3.73	Q00920 flag:	Not Reported
Q00920 magnes mgl:	1.47	Q00929 flag:	Not Reported
Q00929 sodium mgl:	223	Q00937 flag:	Not Reported
Q00937 potass mgl:	1.06	Q01080 flag:	Not Reported
Q01080 strontium:	.08	Q00445 carb mgl:	6.43
Q00440 bicarb mgl:	450.65	Q00945 flag:	Not Reported
Q00945 sulfate mgl:	1.7	Q00940 flag:	Not Reported
Q00940 chloride mg:	110	Q00951 flag:	Not Reported
Q00951 fluoride mg:	1.38	Q71850 flag:	<
Q71850 nitrate mgl:	.09	Q00403 flag:	Not Reported
Q00403 ph:	7.88	Q70300 tds:	585
Q00415 flag:	Not Reported	Q00415 phen alk:	5.36
Q00410 flag:	Not Reported	Q00410 total alk:	380
Q00900 tot hardnes:	15	Q00932 percent na:	96
Q00931 sar:	24.76	Q71860 rsc:	7.29
Q00095 flag:	Not Reported	Q00095 spec cond:	1065
Date entered:	05/17/2001 00:00:00	User name:	cmuller

State well number:	8117406	Mm date:	6
Dd date:	12	Yydate:	1997
Sample number:	1	Sample time:	0900
Temp centigrade:	28	Top s interval:	Not Reported
Bottom s interval:	Not Reported	Samp int aqcode:	Not Reported
Collection remarks:	Not Reported	Reliability rem:	10
Collecting agency:	01	Lab code:	23
Bu wqanalysis:	B	Q00955 flag:	Not Reported
Q00955 silica mgl:	14.7	Q00910 flag:	Not Reported
Q00910 calcium mgl:	2.46	Q00920 flag:	Not Reported
Q00920 magnes mgl:	.67	Q00929 flag:	Not Reported
Q00929 sodium mgl:	242	Q00937 flag:	Not Reported
Q00937 potass mgl:	1.12	Q01080 flag:	Not Reported
Q01080 strontium:	.1	Q00445 carb mgl:	6
Q00440 bicarb mgl:	424.68	Q00945 flag:	Not Reported
Q00945 sulfate mgl:	9.43	Q00940 flag:	Not Reported
Q00940 chloride mg:	97.7	Q00951 flag:	Not Reported
Q00951 fluoride mg:	1.8	Q71850 flag:	<
Q71850 nitrate mgl:	.18	Q00403 flag:	Not Reported
Q00403 ph:	8.34	Q70300 tds:	584
Q00415 flag:	Not Reported	Q00415 phen alk:	5
Q00410 flag:	Not Reported	Q00410 total alk:	358
Q00900 tot hardnes:	8	Q00932 percent na:	98
Q00931 sar:	35.3	Q71860 rsc:	6.98
Q00095 flag:	Not Reported	Q00095 spec cond:	982
Date entered:	06/18/1997 00:00:00	User name:	jderton

State well number:	8117406	Mm date:	8
Dd date:	18	Yydate:	2005
Sample number:	1	Sample time:	1430
Temp centigrade:	29	Top s interval:	Not Reported
Bottom s interval:	Not Reported	Samp int aqcode:	Not Reported
Collection remarks:	Not Reported	Reliability rem:	10
Collecting agency:	01	Lab code:	24
Bu wqanalysis:	U	Q00955 flag:	Not Reported
Q00955 silica mgl:	14.3	Q00910 flag:	Not Reported
Q00910 calcium mgl:	4	Q00920 flag:	Not Reported
Q00920 magnes mgl:	1.6	Q00929 flag:	Not Reported
Q00929 sodium mgl:	242	Q00937 flag:	Not Reported
Q00937 potass mgl:	.9	Q01080 flag:	Not Reported
Q01080 strontium:	.11	Q00445 carb mgl:	0
Q00440 bicarb mgl:	Not Reported	Q00945 flag:	Not Reported
Q00945 sulfate mgl:	Not Reported	Q00940 flag:	Not Reported
Q00940 chloride mg:	Not Reported	Q00951 flag:	Not Reported
Q00951 fluoride mg:	Not Reported	Q71850 flag:	Not Reported
Q71850 nitrate mgl:	Not Reported	Q00403 flag:	Not Reported
Q00403 ph:	8.16	Q70300 tds:	Not Reported
Q00415 flag:	Not Reported	Q00415 phen alk:	0
Q00410 flag:	Not Reported	Q00410 total alk:	Not Reported
Q00900 tot hardnes:	17	Q00932 percent na:	97
Q00931 sar:	25.86	Q71860 rsc:	Not Reported
Q00095 flag:	Not Reported	Q00095 spec cond:	1016
Date entered:	02/14/2006 14:16:29	User name:	drjones

State well number:	8117406	Mm date:	10
Dd date:	20	Yydate:	1992
Sample number:	1	Sample time:	1500
Temp centigrade:	28	Top s interval:	Not Reported
Bottom s interval:	Not Reported	Samp int aqcode:	Not Reported
Collection remarks:	Not Reported	Reliability rem:	14
Collecting agency:	01	Lab code:	03
Bu wqanalysis:	B	Q00955 flag:	Not Reported
Q00955 silica mgl:	10.4	Q00910 flag:	Not Reported
Q00910 calcium mgl:	6	Q00920 flag:	Not Reported
Q00920 magnes mgl:	2	Q00929 flag:	Not Reported
Q00929 sodium mgl:	210.35	Q00937 flag:	Not Reported
Q00937 potass mgl:	1	Q01080 flag:	Not Reported
Q01080 strontium:	Not Reported	Q00445 carb mgl:	0
Q00440 bicarb mgl:	480.82	Q00945 flag:	Not Reported
Q00945 sulfate mgl:	2	Q00940 flag:	Not Reported
Q00940 chloride mg:	57.5	Q00951 flag:	Not Reported
Q00951 fluoride mg:	1.84	Q71850 flag:	Not Reported
Q71850 nitrate mgl:	3.54	Q00403 flag:	Not Reported
Q00403 ph:	8.01	Q70300 tds:	531
Q00415 flag:	Not Reported	Q00415 phen alk:	0
Q00410 flag:	Not Reported	Q00410 total alk:	394
Q00900 tot hardnes:	23	Q00932 percent na:	95
Q00931 sar:	19	Q71860 rsc:	7.42
Q00095 flag:	Not Reported	Q00095 spec cond:	969
Date entered:	Not Reported	User name:	jderton

State well number:	8117406	Group number:	1
Remarks 1:	Owners well #2.	Remarks 2:	Not Reported

Direction Distance		Database	EDR ID Number
NE **1/4 - 1/2 Mile**		**OIL_GAS**	**TXOG20000136137**

Surface id:	81145		
Symnum:	3	Api:	32130931
Reliab:	15		
Longn:	-95.95411522		
Latn:	28.7145788		
Site id:	TXOG20000136137		

Surface id:	81145		
Symnum:	3	Apinum:	4232130931
Out fips:	N	Reliab:	15
Cwellnum:	1	Radioact:	Not Reported
Longn:	-95.9541152		
Latn:	28.7145788		

AREA RADON INFORMATION

State Database: TX Radon

Radon Test Results

County	Mean	Total Sites	%>4 pCi/L	%>20 pCi/L	Min pCi/L	Max pCi/L
MATAGORDA	.7	9	.0	.0	<.5	2.9

Federal EPA Radon Zone for MATAGORDA County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for MATAGORDA COUNTY, TX

Number of sites tested: 8

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.725 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW R Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Public Water Supply Sources Databases
Source: Texas Commission on Environmental Quality
Telephone: 512-239-6199
Locations of public drinking water sources maintained by the TCEQ

Groundwater Database
Source: Texas Water Development Board
Telephone: 512-936-0837

Well Report Database
Source: Department of Licensing and Regulation
Telephone: 512-936-0833

Water Well Database
Source: Harris-Galveston Coastal Subsidence District
Telephone: 281-486-1105

Submitted Driller’s Reports Database
Source: Texas Water Development Board
Telephone: 512-936-0833
The Submitted Driller’s Reports Database is populated from the online Texas Well Report Submission and Retrieval System which is a cooperative Texas Department of Licensing and Regulation (TDLR) and Texas Water Development Board (TWDB) application that registered water-well drillers use to submit their required reports.

OTHER STATE DATABASE INFORMATION

Texas Oil and Gas Wells:
Source: Texas Railroad Commission
Telephone: 512-463-6882
Oil and gas well locations

RADON

State Database: TX Radon
Source: Department of Health
Telephone: 512-834-6688
Rinal Report of the Texas Indoor Radon Survey

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

STREET AND ADDRESS INFORMATION

Tethered Aerostat Radar

Tethered Aerostat Radar

Matagorda, TX 77457

Inquiry Number: 2284889.4

August 05, 2008

The EDR Historical Topographic Map Report

EDR® Environmental Data Resources Inc

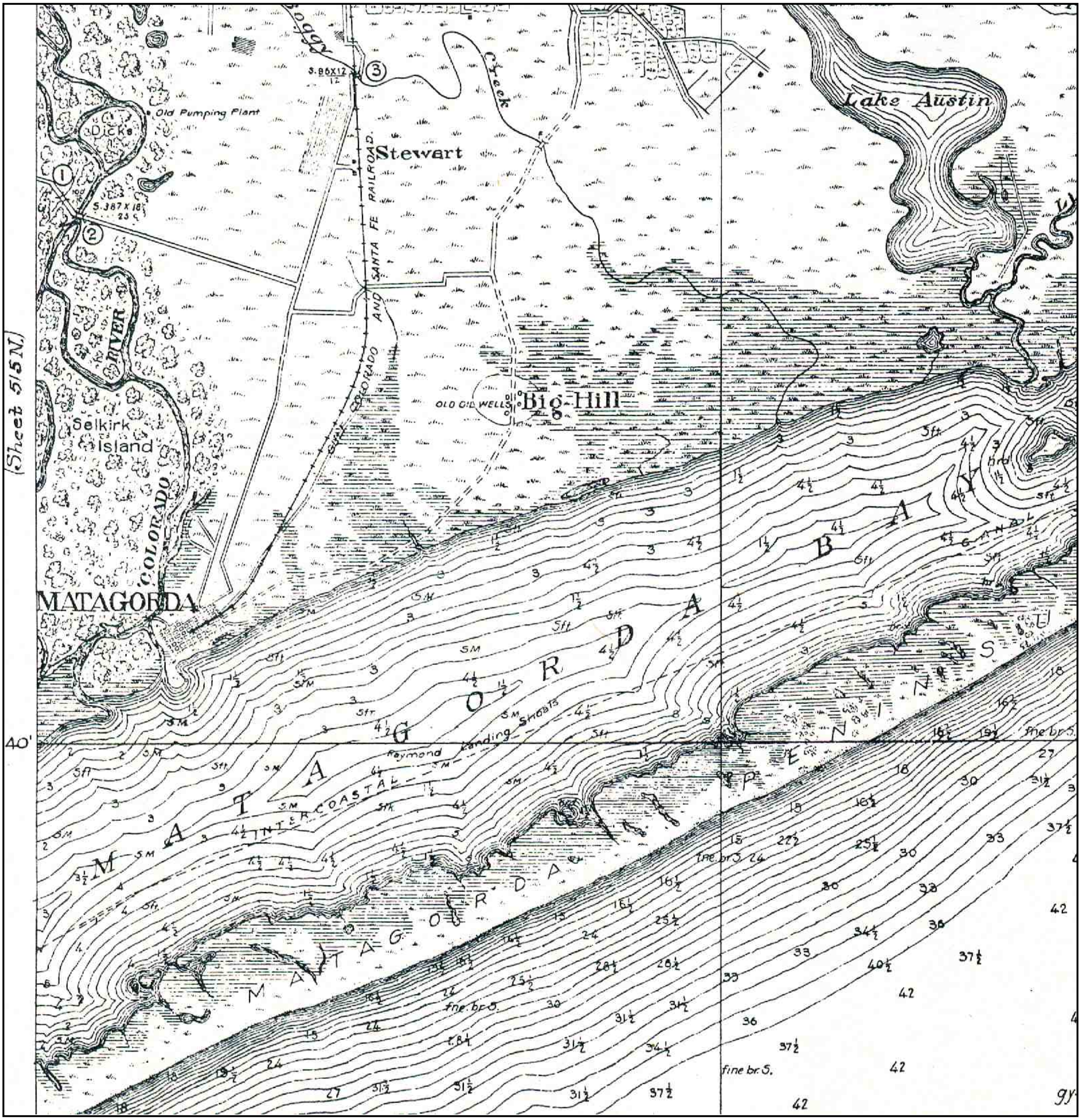
440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Historical Topographic Map Report

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

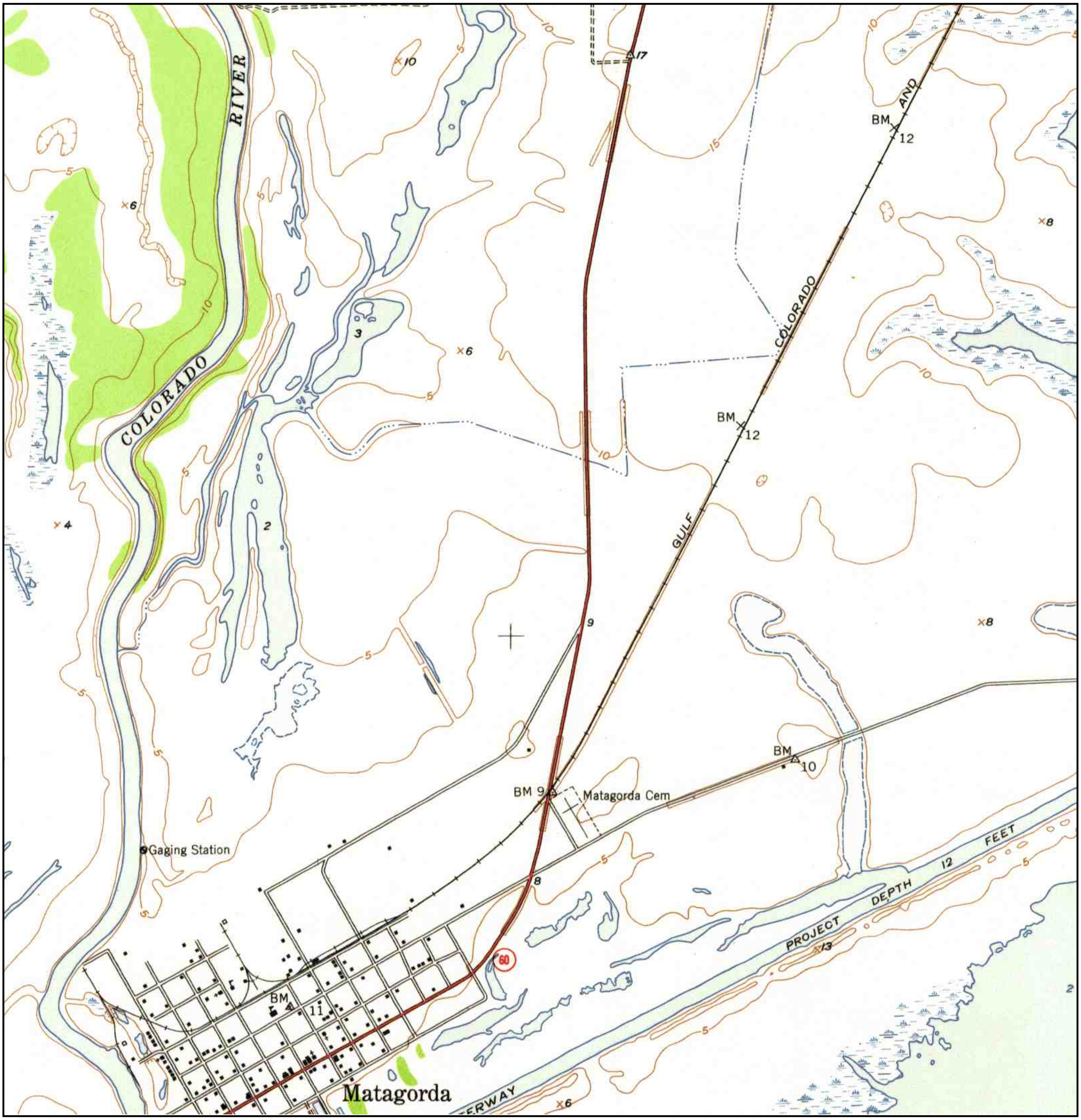
Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Historical Topographic Map



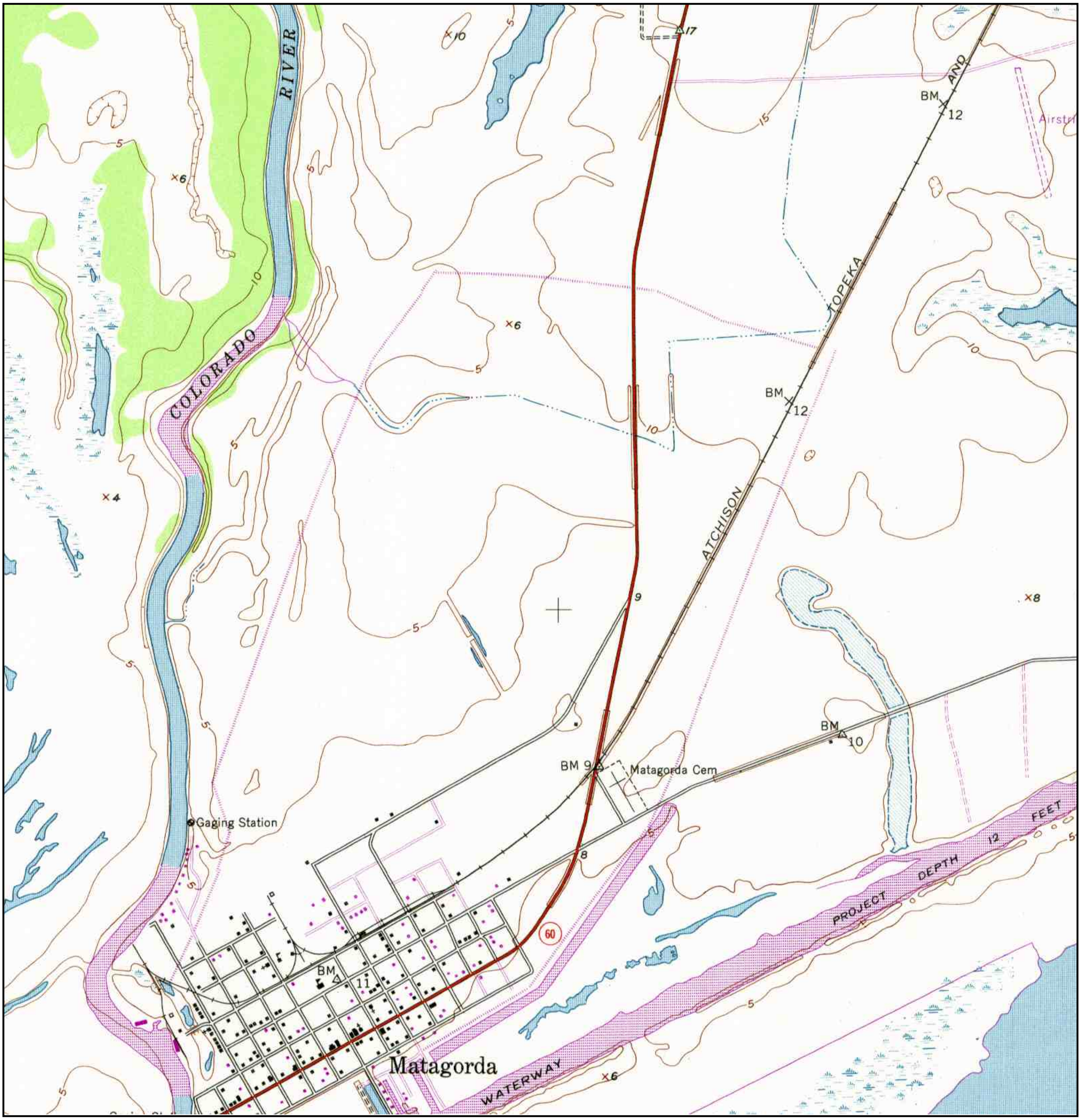
N ↑	TARGET QUAD NAME: MATAGORDA MAP YEAR: 1915 SERIES: 30 SCALE: 1:125000	SITE NAME: Tethered Aerostat Radar ADDRESS: Tethered Aerostat Radar Matagorda, TX 77457 LAT/LONG: 28.7106 / 95.9578	CLIENT: Environmental Express Serv,EES CONTACT: Jackie Baerwald INQUIRY#: 2284889.4 RESEARCH DATE: 08/05/2008

Historical Topographic Map



N	TARGET QUAD NAME: MATAGORDA MAP YEAR: 1952 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Tethered Aerostat Radar ADDRESS: Tethered Aerostat Radar Matagorda, TX 77457 LAT/LONG: 28.7106 / 95.9578	CLIENT: Environmental Express Serv,EES CONTACT: Jackie Baerwald INQUIRY#: 2284889.4 RESEARCH DATE: 08/05/2008

Historical Topographic Map



N	TARGET QUAD		SITE NAME:	Tethered Aerostat Radar	CLIENT:	Environmental Express Serv,EES
	NAME:	MATAGORDA	ADDRESS:	Tethered Aerostat Radar	CONTACT:	Jackie Baerwald
	MAP YEAR:	1972		Matagorda, TX 77457	INQUIRY#:	2284889.4
	PHOTOREVISED FROM:	1952	LAT/LONG:	28.7106 / 95.9578	RESEARCH DATE:	08/05/2008
	SERIES:	7.5				
	SCALE:	1:24000				

Tethered Aerostat Radar
Tethered Aerostat Radar
Matagorda, TX 77457

Inquiry Number: 2284889.5
August 06, 2008

The EDR Aerial Photo Decade Package

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDRs professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

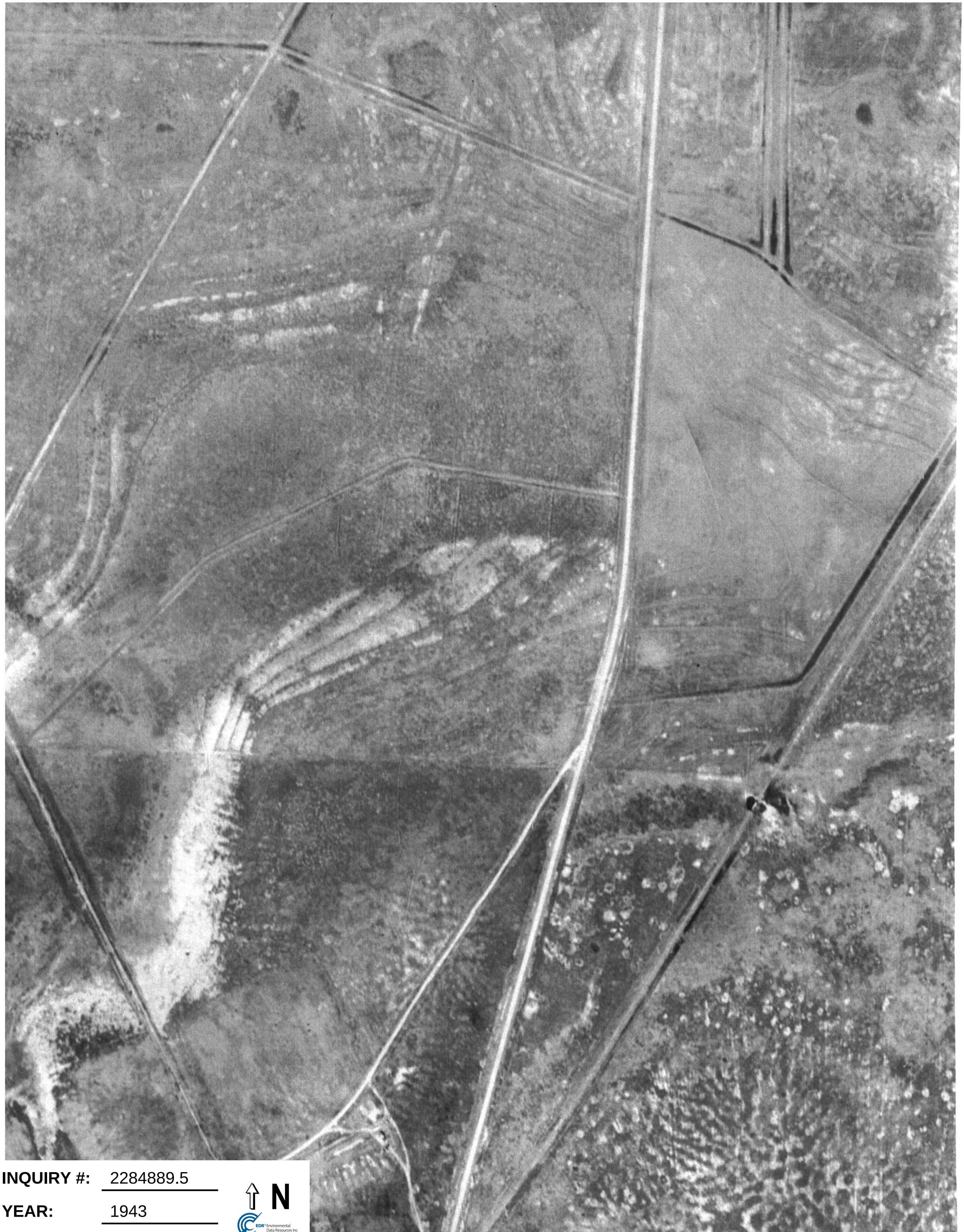
When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Date EDR Searched Historical Sources:
Aerial Photography August 06, 2008

Target Property:
Tethered Aerostat Radar
Matagorda, TX 77457

Year	***Scale***	***Details***	***Source***
1943	Aerial Photograph. Scale: 1"=500'	Flight Year: 1943	ASCS
1958	Aerial Photograph. Scale: 1"=500'	Flight Year: 1958 Photo Not Available - Image missing from collection	ASCS
1965	Aerial Photograph. Scale: 1"=500'	Flight Year: 1965 Best Copy Available from original source	ASCS
1978	Aerial Photograph. Scale: 1"=500'	Flight Year: 1978	TXDOT
1991	Aerial Photograph. Scale: 1"=500'	Flight Year: 1991	TXDOT
1995	Aerial Photograph. Scale: 1"=500'	Flight Year: 1995	USGS-CIR
2004	Aerial Photograph. Scale: 1"=500'	Flight Year: 2004	USDA-CIR
2005	Aerial Photograph. Scale: 1"=484'	Flight Year: 2005	EDR



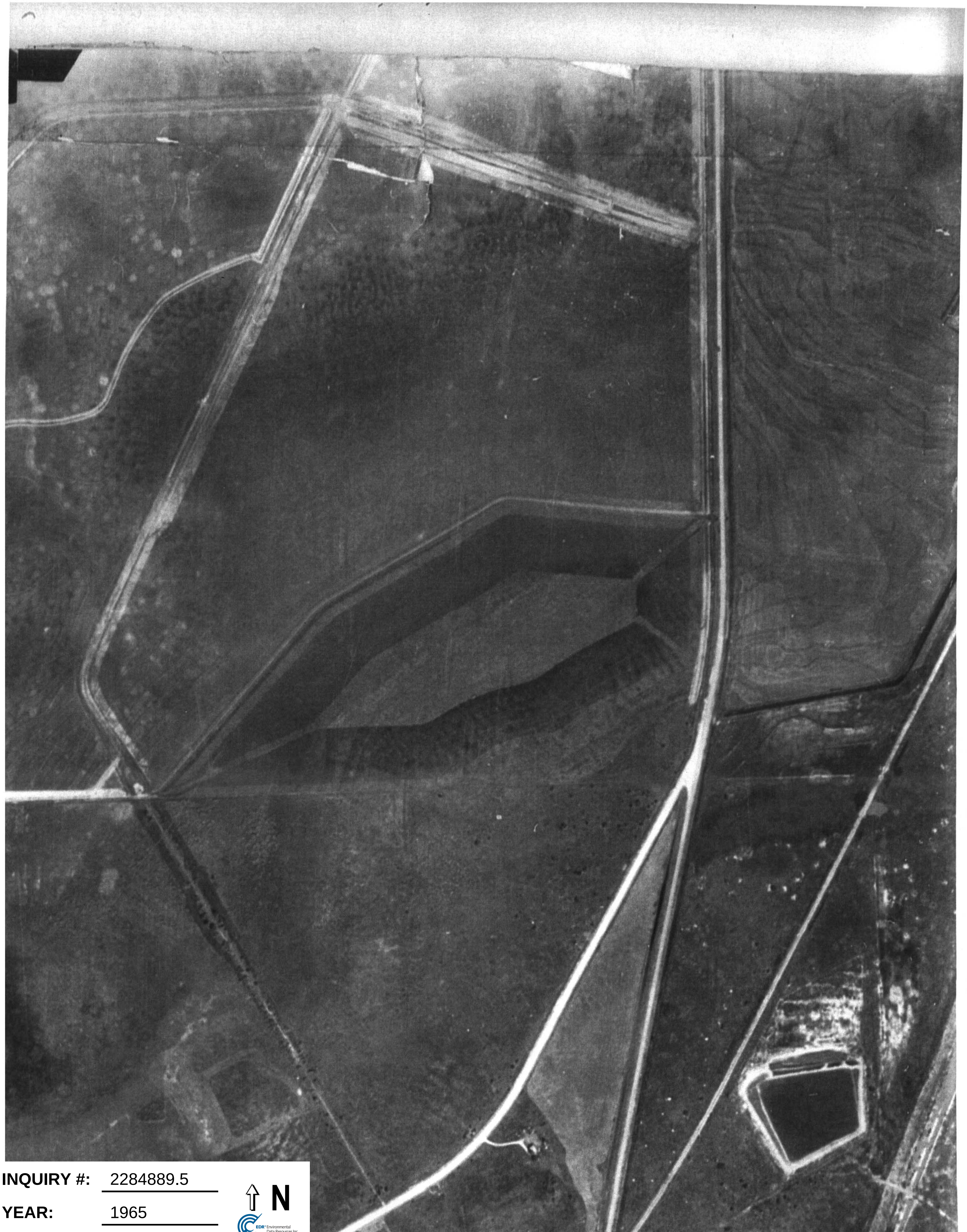
INQUIRY #: 2284889.5

YEAR: 1943

= 500'

N

EDR Environmental Data Resources Inc



INQUIRY #: 2284889.5

YEAR: 1965

N

= 500'

INQUIRY #: 2284889.5

YEAR: 1978

= 500'

N

INQUIRY #: 2284889.5

YEAR: 1991

= 500'

N

EDR Environmental Data Resources Inc

INQUIRY #: 2284889.5

YEAR: 1995

= 500'

N

EDR Environmental Data Resources Inc

INQUIRY #: 2284889.5

YEAR: 2004

= 500'

N


INQUIRY #: 2284889.5
YEAR: 2005
= 484'
N
EDR Environmental Data Resources Inc

Appendix F
Site Inspection Documents

2000 Matagorda TARS Site EBS

Included on CD enclosed.

2000 Matagorda TARS Site EA

Included on CD enclosed.

In Reply Cite:
Contract F44650-96-C0010 TARS 9-0489
28 June 1999

Department of the Air Force
ACC PMS/SUT
11817 Cannon Blvd, Suite # 306
Newport News, Va. 23606-1988

Subject: Pollution Incident Report - CDRL A-038, Matagorda, Texas

1. Name: Lockheed Martin System Support and Training Services
TARS Site Matagorda
Matagorda, Texas
Phone: (409) 863-2027
Site Manager: Mr. C. Fenner

2. Incident Report: Initial Report

3. Date and Time of Incident: 26 June 1999, 2330Z

4. Actual Damage/Potential Threat: Auxiliary power unit had a hydraulic hose failure. It released approximately two gallons of hydraulic fluid into machinery enclosure.

5. Location of Incident: Inside monorail system - pad area

6. Cause of Incident: Failure of hydraulic hose at the APU

7. Type and estimated amount of pollutant: Approximately 2 Gallons of hydraulic fluid

8. Corrective Action to eliminate pollution source: Immediately replaced hydraulic hose.

9. Corrective Action: Collected all spilled media using oil absorbent material. Placed contaminated absorbent material in drum. Place drum in hazardous waste storage area pending disposition instructions from CMO ES&H

10. Assistance Required: None

11. Estimated Completion Date of Remedial: Completed 27 Jun 99

12. Anticipated reaction by news media: None

13. Time of official spill notification to the National Response Center: None

14. Description of any problems encountered during implementation of the Spill Prevention, Control, and Countermeasure Plan: None

15. Direct your question to Mr. Guy Chauvin, TARS ES&H, (757) 558-2317.

//Signed//

Michael Cain
Manager, Contracting and Finance
Lockheed Martin Systems Support & Training Services

cc ACC PMS/SUT
ACC CONS/LGCO
OLC, ACC PMS

Appendix G
Threatened and Endangered Species

Last Revision: 11/20/2007 4:58:00 PM

MATAGORDA COUNTY

BIRDS

		Federal Status	State Status
American Peregrine Falcon	*Falco peregrinus anatum*	DL	E

year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Arctic Peregrine Falcon	*Falco peregrinus tundrius*	DL	T

migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Bald Eagle	*Haliaeetus leucocephalus*	DL	T

found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Black Rail	*Laterallus jamaicensis*		

salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous year's dead grasses; nest usually hidden in marsh grass or at base of Salicornia

Brown Pelican	*Pelecanus occidentalis*	LE	E

largely coastal and near shore areas, where it roosts and nests on islands and spoil banks

Eskimo Curlew	*Numenius borealis*	LE	E

historic; nonbreeding: grasslands, pastures, plowed fields, and less frequently, marshes and mudflats

Henslow's Sparrow	*Ammodramus henslowii*		

wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking

Peregrine Falcon	*Falco peregrinus*	DL	E T

both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, thus the species level shows this dual listing status; because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.

Piping Plover	*Charadrius melodus*	LT	T

wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats

Reddish Egret	*Egretta rufescens*		T

resident of the Texas Gulf Coast; brackish marshes and shallow salt ponds and tidal flats; nests on ground or in trees or bushes, on dry coastal islands in brushy thickets of yucca and prickly pear

MATAGORDA COUNTY

BIRDS — Federal Status — State Status

Snowy Plover *Charadrius alexandrinus*

formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast

Sooty Tern *Sterna fuscata* — State Status: T

predominately 'on the wing'; does not dive, but snatches small fish and squid with bill as it flies or hovers over water; breeding April-July

Southeastern Snowy Plover *Charadrius alexandrinus tenuirostris*

wintering migrant along the Texas Gulf Coast beaches and bayside mud or salt flats

Western Burrowing Owl *Athene cunicularia hypugaea*

open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

Western Snowy Plover *Charadrius alexandrinus nivosus*

uncommon breeder in the Panhandle; potential migrant; winter along coast

White-faced Ibis *Plegadis chihi* — State Status: T

prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats

White-tailed Hawk *Buteo albicaudatus* — State Status: T

near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral; breeding March-May

Whooping Crane *Grus americana* — Federal Status: LE — State Status: E

potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties

Wood Stork *Mycteria americana* — State Status: T

forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960

CRUSTACEANS — Federal Status — State Status

A crayfish *Cambarellus texanus*

shallow water; benthic, burrowing in or using soil; apparently tolerant of warmer waters; prefers standing water of ditches in which there is emergent vegetation; wll burrow in dry periods; detritivore

FISHES — Federal Status — State Status

American eel *Anguilla rostrata*

MATAGORDA COUNTY

FISHES		Federal Status	State Status

coastal waterways below reservoirs to gulf; spawns January to February in ocean, larva move to coastal waters, metamorphose, then females move into freshwater; most aquatic habitats with access to ocean, muddy bottoms, still waters, large streams, lakes; can travel overland in wet areas; males in brackish estuaries; diet varies widely, geographically, and seasonally

INSECTS		Federal Status	State Status
Gulf Coast clubtail	*Gomphus modestus*		

medium river, moderate gradient,and streams with silty sand or rocky bottoms; adults forage in trees, males perch near riffles to wait for females, larvae overwinter; flight season late Apr - late Jun

MAMMALS		Federal Status	State Status
Louisiana black bear	*Ursus americanus luteolus*	LT	T

possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas

Ocelot	*Leopardus pardalis*	LE	E

dense chaparral thickets; mesquite-thorn scrub and live oak mottes; avoids open areas; breeds and raises young June-November

Plains spotted skunk	*Spilogale putorius interrupta*		

catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie

Red wolf	*Canis rufus*	LE	E

extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies

West Indian manatee	*Trichechus manatus*	LE	E

Gulf and bay system; opportunistic, aquatic herbivore

MOLLUSKS		Federal Status	State Status
Creeper (squawfoot)	*Strophitus undulatus*		

small to large streams, prefers gravel or gravel and mud in flowing water; Colorado, Guadalupe, San Antonio, Neches (historic), and Trinity (historic) River basins

Pistolgrip	*Tritogonia verrucosa*		

stable substrate, rock, hard mud, silt, and soft bottoms, often buried deeply; east and central Texas, Red through San Antonio River basins

Rock pocketbook	*Arcidens confragosus*		

mud, sand, and gravel substrates of medium to large rivers in standing or slow flowing water, may tolerate moderate currents and some reservoirs, east Texas, Red through Guadalupe River basins

MATAGORDA COUNTY

MOLLUSKS

		Federal Status	State Status
Smooth pimpleback	*Quadrula houstonensis*		

small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins

Texas fawnsfoot	*Truncilla macrodon*		

little known; possibly rivers and larger streams, and intolerant of impoundment; flowing rice irrigation canals, possibly sand, gravel, and perhaps sandy-mud bottoms in moderate flows; Brazos and Colorado River basins

REPTILES

		Federal Status	State Status
Atlantic hawksbill sea turtle	*Eretmochelys imbricata*	LE	E

Gulf and bay system

Green sea turtle	*Chelonia mydas*	LT	T

Gulf and bay system; shallow water seagrass beds, open water between feeding and nesting areas, barrier island beaches; adults are herbivorous feeding on sea grass and seaweed; juveniles are omnivorous feeding initially on marine invertebrates, then increasingly on sea grasses and seaweeds

Gulf Saltmarsh snake	*Nerodia clarkii*		

saline flats, coastal bays, and brackish river mouths

Kemp's Ridley sea turtle	*Lepidochelys kempii*	LE	E

Gulf and bay system

Leatherback sea turtle	*Dermochelys coriacea*	LE	E

Gulf and bay system

Loggerhead sea turtle	*Caretta caretta*	LT	T

Gulf and bay system

Smooth green snake	*Liochlorophis vernalis*		T

Gulf Coastal Plain; mesic coastal shortgrass prairie vegetation; prefers dense vegetation

Texas diamondback terrapin	*Malaclemys terrapin littoralis*		

coastal marshes, tidal flats, coves, estuaries, and lagoons behind barrier beaches; brackish and salt water; burrows into mud when inactive; may venture into lowlands at high tide

Texas horned lizard	*Phrynosoma cornutum*		T

open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September

Texas scarlet snake	*Cemophora coccinea lineri*		T

MATAGORDA COUNTY

REPTILES — Federal Status — State Status

mixed hardwood scrub on sandy soils; feeds on reptile eggs; semi-fossorial; active April-September

Texas tortoise — *Gopherus berlandieri* — State Status: T

open brush with a grass understory is preferred; open grass and bare ground are avoided; when inactive occupies shallow depressions at base of bush or cactus, sometimes in underground burrows or under objects; longevity greater than 50 years; active March-November; breeds April-November

Timber/Canebrake rattlesnake — *Crotalus horridus* — State Status: T

swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto

PLANTS — Federal Status — State Status

Coastal gay-feather — *Liatris bracteata*

endemic; black clay soils of prairie remnants; flowering in fall

Shinner's sunflower — *Helianthus occidentalis ssp plantagineus*

mostly in prairies on the Coastal Plain, with several slightly disjunct populations in the Pineywoods and South Texas Brush Country

Threeflower broomweed — *Thurovia triflora*

endemic; black clay soils of remnant grasslands, also tidal flats; flowering July-November

TEXAS
PARKS &
WILDLIFE

Instructions for County Lists of Texas' Special Species

The Texas Parks and Wildlife (TPWD) county lists **include**:

Vertebrates, Invertebrates, and Vascular Plants identified as being of conservation concern by TPWD within Texas. These special species lists are comprised of species, subspecies, and varieties that are federally listed; proposed to be federally listed; have federal candidate status; are state listed; or carry a global conservation status indicating a species is critically imperiled, very rare, vulnerable to extirpation, or uncommon.

The TPWD county lists **do not include**:

Natural Plant Communities such as Little Bluestem-Indiangrass Series (native prairie remnant), Water Oak-Willow Oak Series (bottomland hardwood community), Saltgrass-Cordgrass Series (salt or brackish marsh), Sphagnum-Beakrush Series (seepage bog).

Other Significant Features such as bird rookeries, migratory songbird fallout areas, comprehensive migratory bird information, bat roosts, bat caves, invertebrate caves, and prairie dog towns.

These lists are not all inclusive for all rare species distributions. The lists were compiled, developed, and are updated based on field guides, staff expertise, scientific publications, and the TPWD Natural Diversity Database (NDD) (formerly the Biological and Conservation Data System) occurrence data. Historic ranges for some state extirpated species, full historic distributions for some extant species, accidentals and irregularly appearing species, and portions of migratory routes for particular species are not necessarily included. Species that appear on county lists do not all share the same probability of occurrence within a county. Some species are migrants or wintering residents only. Additionally, a few species may be historic or considered extirpated within a county.

TPWD includes the Federal listing status for your convenience and makes every attempt to keep the information current and correct. However, the US Fish and Wildlife Service (FWS) is the responsible authority for Federal listing status. The TPWD lists do not substitute for contact with the FWS and federally listed species county ranges may vary from the FWS county level species lists because of the inexact nature of range map development and use.

Status Key:

LE, LT - Federally Listed Endangered/Threatened
PE, PT - Federally Proposed Endangered/Threatened
E/SA, T/SA - Federally Listed Endangered/Threatened by Similarity of Appearance
C - Federal Candidate for Listing; formerly Category 1 Candidate
DL, PDL - Federally Delisted/Proposed for Delisting
NL - Not Federally Listed
E, T - State Listed Endangered/Threatened
NT - Not tracked or no longer tracked by the State
"blank" - Rare, but with no regulatory listing status

This information is specifically for your assistance only; due to continuing data updates, **please do not redistribute the lists**, instead refer all requesters to the web site at: http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species.phtml or to our office for the most current information available. For questions regarding county lists, please call (512) 389-4571.

Please use the following citation to credit the source for this county level information:

Texas Parks and Wildlife Department, Wildlife Division, Diversity and Habitat Assessment Programs. County Lists of Texas' Special Species. [county name(s) and revised date(s)].

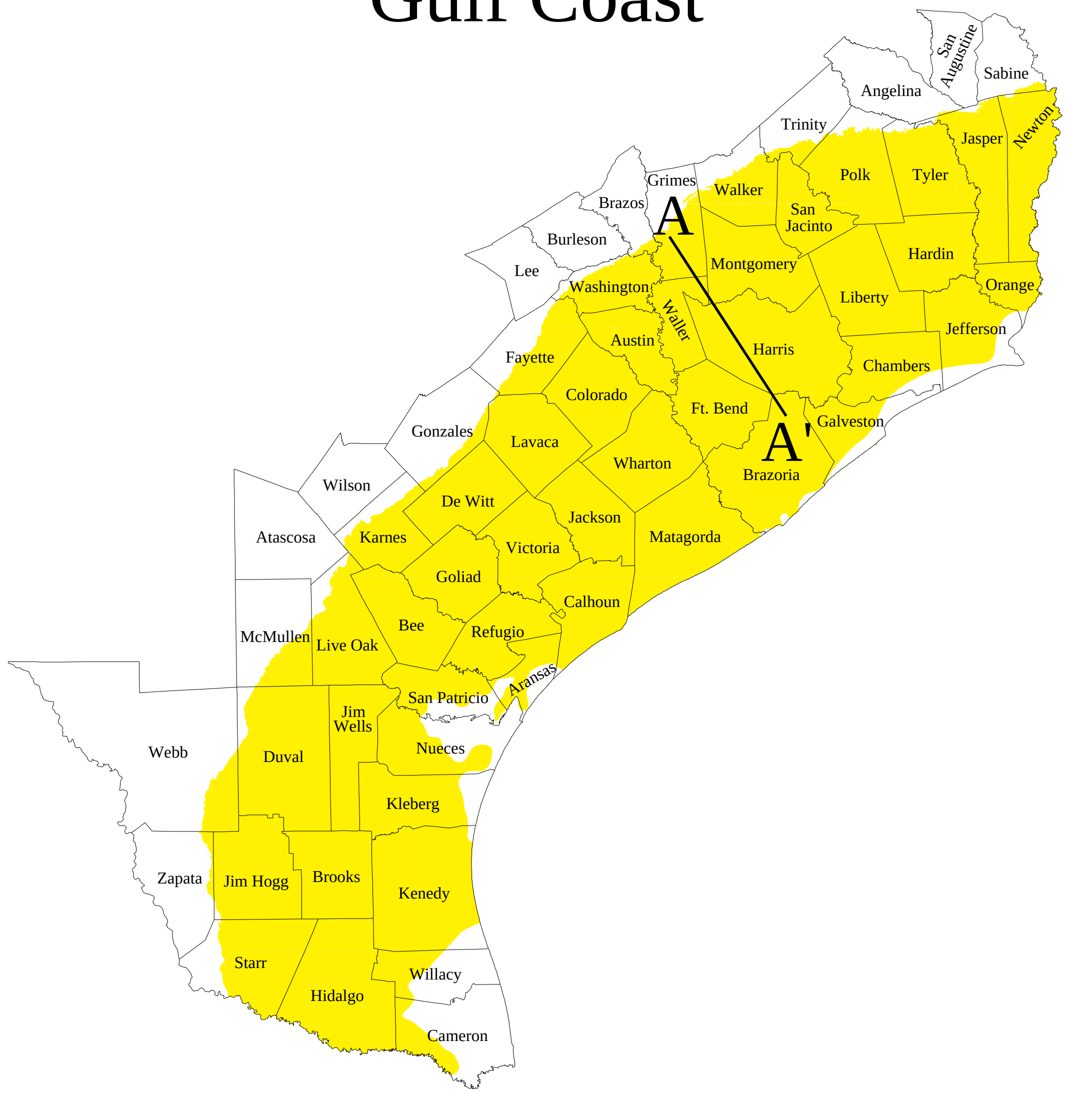
Last Revision: 17 Sep 2007

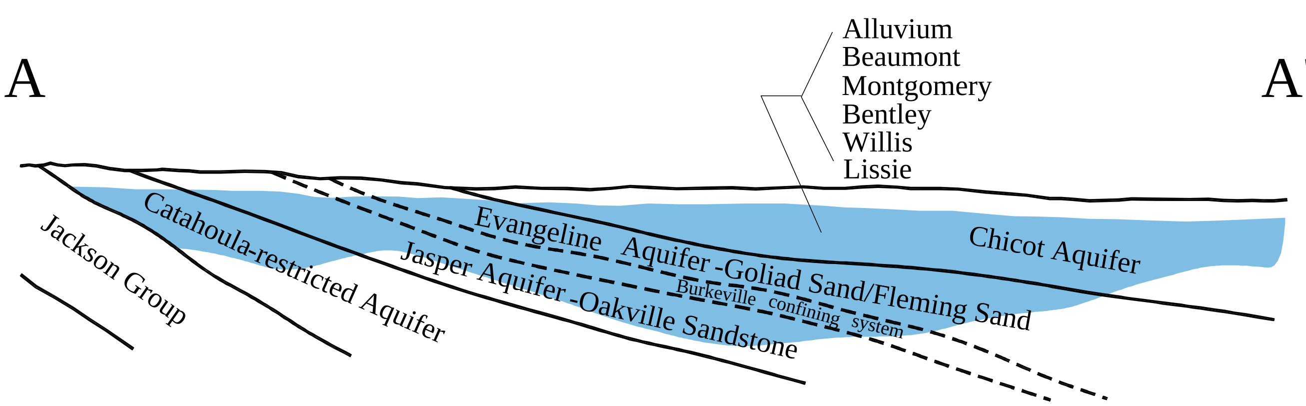
Appendix H
Additional Resources

Soil Survey of Matagorda County, Texas

Included on CD enclosed.

Gulf Coast





Modified from Baker, 1979

Gulf Coast Aquifer

The Gulf Coast aquifer forms a wide belt along the Gulf of Mexico from Florida to Mexico. In Texas, the aquifer provides water to all or parts of 54 counties and extends from the Rio Grande northeastward to the Louisiana-Texas border. Municipal and irrigation uses account for 90 percent of the total pumpage from the aquifer. The Greater Houston metropolitan area is the largest municipal user, where well yields average about 1,600 gal/min.

The aquifer consists of complex interbedded clays, silts, sands, and gravels of Cenozoic age, which are hydrologically connected to form a large, leaky artesian aquifer system. This system comprises four major components consisting of the following generally recognized water-producing formations. The deepest is the Catahoula, which contains ground water near the outcrop in relatively restricted sand layers. Above the Catahoula is the Jasper aquifer, primarily contained within the Oakville Sandstone. The Burkeville confining layer separates the Jasper from the overlying Evangeline aquifer, which is contained within the Fleming and Goliad sands. The Chicot aquifer, or upper component of the Gulf Coast aquifer system, consists of the Lissie, Willis, Bentley, Montgomery, and Beaumont formations, and overlying alluvial deposits. Not all formations are present throughout the system, and nomenclature often differs from one end of the system to the other. Maximum total sand thickness ranges from 700 feet in the south to 1,300 feet in the northern extent.

Water quality is generally good in the shallower portion of the aquifer. Ground water containing less than 500 mg/l dissolved solids is usually encountered to a maximum depth of 3,200 feet in the aquifer from the San Antonio River Basin northeastward to Louisiana. From the San Antonio River Basin southwestward to Mexico, quality deterioration is evident in the form of increased chloride concentration and saltwater encroachment along the coast. Little of this ground water is suitable for prolonged irrigation due to either high salinity or alkalinity, or both. In several areas at or near the coast, including Galveston Island and the central and southern parts of Orange County, heavy municipal or industrial pumpage had previously caused an updip migration, or saltwater intrusion, of poor-quality water into the aquifer. Recent reductions in pumpage here have resulted in a stabilization and, in some cases, even improvement of ground-water quality.

Years of heavy pumpage for municipal and manufacturing use in portions of the aquifer have resulted in areas of significant water-level decline. Declines of 200 feet to 300 feet have been measured in some areas of eastern and southeastern Harris and northern Galveston counties. Other areas of significant water-level declines include the Kingsville area in Kleberg County and portions of Jefferson, Orange, and Wharton counties. Some of these declines have resulted in compaction of dewatered clays and significant land surface subsidence. Subsidence is generally less than 0.5 foot over most of the Texas coast, but has been as much as nine feet in Harris and surrounding counties. As a result, structural damage and flooding have occurred in many low-lying areas along Galveston Bay in Baytown, Texas City, and Houston. Conversion to surface-water use in many of the problem areas has reversed the decline trend.

References

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Eastern Brown Pelican

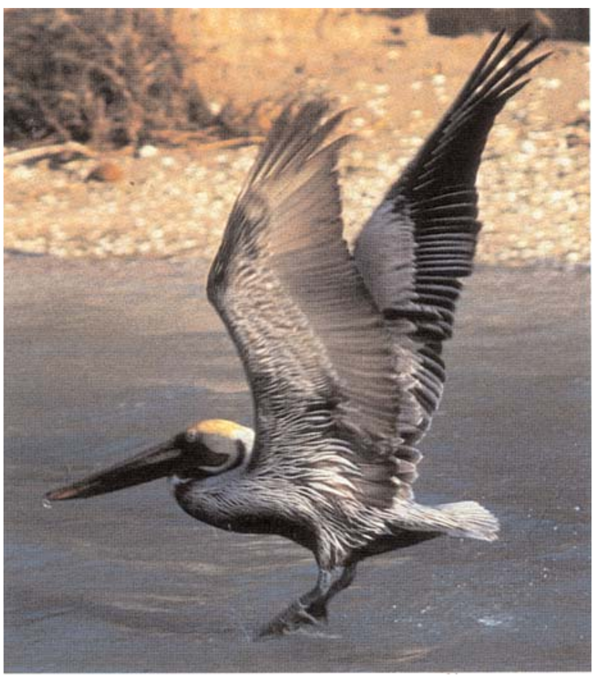
Scientific Name: *Pelecanus occidentalis occidentalis*

Federal Status: Endangered, 10/13/70 • State Status: Endangered

The Eastern Brown Pelican has recovered sufficiently in Florida, Alabama, and the United States Atlantic coast to be delisted. Although numbers are increasing in Louisiana and Texas, it is currently still listed as Endangered in Texas and Louisiana.

Description

With its 6-foot wingspread and 18-inch bill with pouch along the underside, no other bird could be easily mistaken for this unique seashore dweller. Possessing broad wings and a bulky body, a Brown Pelican weighs about 9 pounds. A graceful flier, the pelican's powerful wingbeat is one of the slowest among birds. Its feet are webbed to provide power while swimming in or under the water.



Brown Pelican
© TPWD Glen Mills

Nonbreeding adults have a white head and neck, often washed with yellow; a grayish-brown body; and a dark brown to black belly. In breeding birds, the back of the neck is a dark chestnut color with a yellow patch at the base of the foreneck. Some breeding birds develop red or plum colored pouches. Adults molting during incubation and chick-feeding have cream-colored heads and necks. Juveniles are grayish-brown above with whitish underparts. Young birds appear more brown in color as they age, acquiring adult plumage by their third year.

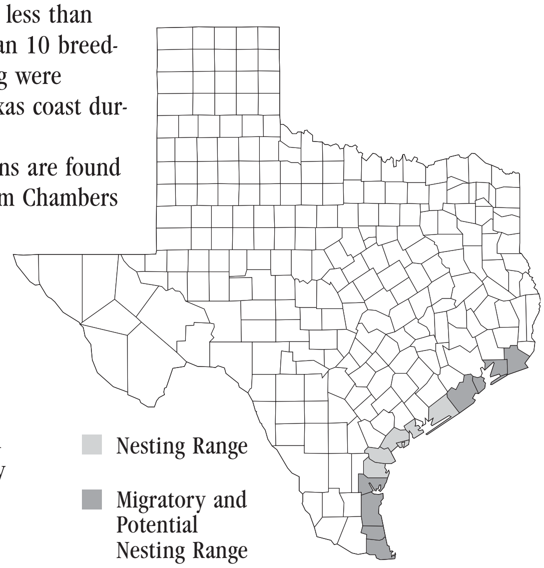
Distribution and Habitat

Historically, the Brown Pelican was found in large numbers along the Atlantic and Gulf coasts from South Carolina to Florida and west to Texas. Today, the birds occur throughout their historic range but their numbers have been greatly reduced.

The earliest population estimate of Brown Pelicans in Texas was that of Sennett in 1879, who estimated 5,000 adults nesting on two islands in Corpus Christi Bay. By 1918, the estimated number was 5,000 birds nesting on the entire Texas coast. The numbers continued to decline sharply from about 1,034 breeding birds on the central coast in 1939 to only 50 birds in 1964. During the period 1967-1974, the Texas population was estimated to be less than 100 birds, with fewer than 10 breeding pairs. Only 40 young were fledged on the entire Texas coast during this period.

Today, Brown Pelicans are found along the Texas coast from Chambers County on the upper coast to Cameron County on the lower coast. Most of the breeding birds nest on Pelican Island in Corpus Christi Bay and Sundown Island near Port O'Connor, both National Audubon Society Sanctuaries. Smaller groups or colonies occasionally nest on Bird Island in Matagorda Bay, a series of older spoil islands in West Matagorda Bay, Dressing Point Island in East Matagorda Bay, and islands in Aransas Bay. Pelican numbers have increased slowly from very low levels in the 1960's and 1970's to an estimated 2,400 breeding pairs in 1995.

Brown Pelicans nest on small, isolated coastal islands where they are safe from predators such as raccoons and coyotes. Nesting habitat ranges from mud banks and spoil islands to offshore islands covered with mangroves and other woody vegetation. Part of the Texas population spends the nonbreeding season along the Texas coast, while others migrate south to spend the winter along the eastern coast of Mexico.



Life History

It is quite an experience to watch a Brown Pelican feeding. Soaring overhead, the bird spots a fish near the surface and keeps it in sight. Rotating into a dive, the pelican plunges 30 to 60 feet bill-first into the water. The impact of hitting the water with such force would stun an ordinary bird, but the Brown Pelican is equipped with air sacs just beneath the skin to cushion the blow. As it enters the water, the loose skin on the underside of the bill extends to form a scoop net with an amazing capacity of 2.5 gallons. If the dive is successful, the pelican quickly drains the water from its pouch and tosses its head back to swallow the fish.

Brown Pelicans can often be seen flying in formation with slow powerful wingbeats, searching the water for Menhaden and Mullet, which form the major portion of

their diet. Several studies of food habits have shown that the diet of Brown Pelicans consists almost entirely of these fish. In one study, Menhaden was by far the most prevalent fish found regurgitated and left lying in pelican colonies. Since gamefish considered desirable by fisherman are not typically included in the pelican's diet, the birds do not compete with man for food.

Brown Pelicans breed in the spring, building their nests in mangrove trees or on the ground. Nests vary greatly in size and structure, consisting of piles of sticks, grass, reeds and other available vegetation. Pelicans usually lay two to four white eggs which are often stained brown by nest materials. The young hatch in about 30 days. Newly hatched pelicans appear helpless indeed, with their black, featherless, leathery skin. They are blind at first and completely dependent upon their parents for food and protection. Until the young birds develop a coat of down, about two weeks after hatching, it is often necessary for the adults to shade them from the direct rays of the sun, which can be fatal.

Young pelicans are fed by both parents. Using its pouch as a feeding trough, the adult regurgitates semidigested fish into it for the young to eat. As the young pelicans grow, they reach farther into the pouch, occasionally reaching down the parent's throat for food. The young are fed for about nine weeks. During this time, each nestling will devour about 150 pounds of fish. The parents spend most of every day catching fish to satisfy the ravenous appetites of their offspring.

Although mortality from predators, weather, and accidents is high for hatchlings, once on their own, Brown Pelicans have a fairly long life span. Adult survival approaches 80% per year, and some birds live 30 years or longer.

Threats and Reasons for Decline

Brown Pelican numbers in Texas began to decline sharply in the 1920's and 1930's, when adult birds were killed and nesting colonies destroyed by fishermen, in the mistaken belief that pelicans compete with man for food. It is estimated that pelican numbers declined by more than 80% in just 16 years, between 1918 and 1934.

Even more damaging, however, was the widespread use of DDT and similar insecticides beginning in the late 1940's. These insecticides were used on farmlands across the United States and in coastal areas to control mosquitoes. DDT does not usually kill adult birds, but it does interfere with calcium metabolism. The result is that the birds lay thin-shelled eggs that break during incubation or are too thin to protect the embryo. Pelicans are fish eaters, and fish are great accumulators of all toxic chemicals that get into coastal waters. The pelican's favorite food, Menhaden, a small filter-feeding fish, trap plankton for food. The plankton absorbed DDT residues from runoff. Thus, the concentration of DDT and Endrin in the environment had a devastating impact on the reproduction of Brown Pelicans, along with other top-of-the-food-chain birds such as Bald Eagles, Ospreys, and Peregrine Falcons. Recovery of these species has been steady since the early 1970's, when DDT and Endrin were banned in the United States.

In Texas today, the major threats to the continued recovery of the Brown Pelican appear to be human disturbance and loss of nesting habitat. Pelicans need safe places to nest, away from predators and man. Many former nesting sites have become accessible to both due to new construction and siltation. The hope is that as the pelican population expands, the birds will colonize the more remote islands still available as nesting sites.

Ongoing Recovery Efforts

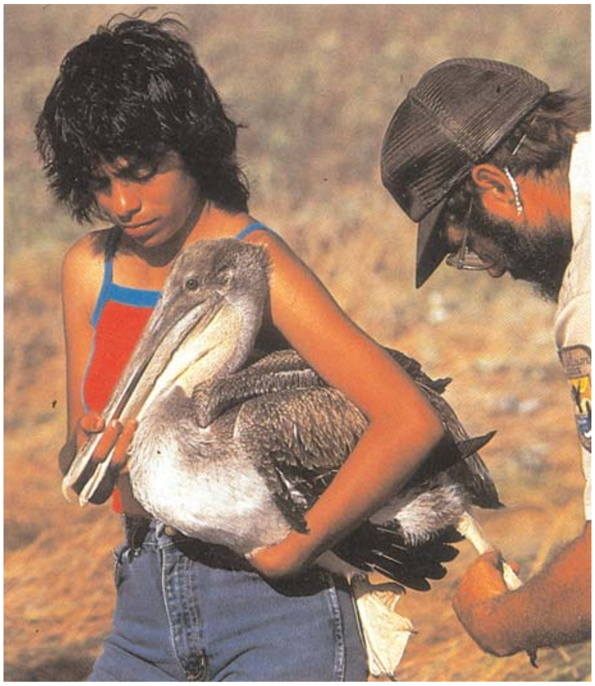
The National Audubon Society, U.S. Fish and Wildlife Service, and Texas Parks and Wildlife Department have combined forces to count, band, and inspect the Brown Pelican nesting colonies. Brown Pelicans banded on the central Texas coast have been reported from the Louisiana coast, Mobile Bay, Alabama, Naples, Florida, and the northeastern coast of Yucatan. Researchers are studying the migration patterns of Brown Pelicans, particularly movements between Texas and Mexico.

Biologists continue to monitor the nesting success of pelicans at existing colonies and surveying the bays for possible new nesting sites. One recently developed technique involves placing pelican decoys near suitable islands in an effort to establish new nesting colonies.

Also, individuals from Texas Parks and Wildlife Department and the National Audubon Society regularly patrol the nesting islands to help minimize the effects of human disturbance. Many of the islands are owned or

Brown Pelican with young
© TPWD

Brown Pelican in non-breeding plumage
© TPWD Leory Williamson



Banding pelicans

leased by the National Audubon Society as colonial waterbird nesting sanctuaries. These islands are regularly posted and patrolled.

Where To See Brown Pelicans

Matagorda Island and Mustang Island State Parks and Padre Island National Seashore offer visitors the opportunity to see and learn more about Brown Pelicans. Public piers and jetties, such as those in Port Aransas, are also good places to watch pelicans.

What You Can Do To Help

Brown Pelicans and other colonial nesting birds (herons, egrets, spoonbills, ibis, terns, gulls, and skimmers) nest on islands. Islands offer protection from predators, but the birds are still vulnerable to human disturbance. Since the hot sun can kill small chicks and embryos in unhatched eggs in a matter of minutes if the adults are flushed from the nests, you can help by staying off islands where birds are nesting. Islands maintained as bird sanctuaries are identified with posted signs. Boaters wishing to observe the birds should bring binoculars and stay behind designated signs so as not to disturb the birds. And whatever you do, don't get off the boat. Pelicans (and other birds) will become agitated and leave their nests if approached. Remember that state and federal laws protect nongame and endangered species, and harassing the birds at any time is illegal. The Endangered Species Act provides protection for listed species against any action that significantly disrupts normal behavior patterns, including breeding, feeding, or sheltering.

Occasionally, a Brown Pelican will mistake a fishing lure or bait for a swimming fish and accidently gets hooked. If this happens to you, don't just cut the line and leave the bird with trailing line that can entangle and kill it. Gently reel the pelican in. Even though pelicans are big birds, they are not that strong, and this is easy to do. Grab the bill first and then fold the wings up to restrain the bird. Next, remove all fishing line and try to remove the hook. Cut the barb or push the hook through, just as you would for a person. If the hook is impossible to remove, leave it in and release the bird.

For years, pelicans reared in Texas have been banded. If you see a pelican with a colored plastic band or an aluminum U.S. Fish and Wildlife Service band on its leg, note which leg, the color of the band, the date, and the location. Send a post card to: Bird Banding Laboratory, U.S. Fish and Wildlife Service, Laurel, Maryland, 20811. This valuable information will help biologists to better understand the life cycle and movements of Brown Pelicans in Texas.

You can be involved in the conservation of Texas' nongame wildlife resources by supporting the Special Nongame and Endangered Species Conservation Fund. Special nongame stamps and decals are available at Texas Parks and Wildlife Department (TPWD) Field Offices, most State Parks, and the License Branch of TPWD headquarters in Austin. Part of the proceeds from the sale of these items are used to conserve habitat and provide information concerning rare and endangered species. Conservation Passports, available from Texas Parks and Wildlife, are valid for one year and allow unlimited access to most State Parks, State Natural Areas, and Wildlife Management Areas. Conservation organizations in Texas also welcome your participation and support.

For More Information Contact

Texas Parks and Wildlife Department
Endangered Resources Branch
4200 Smith School Road
Austin, Texas 78744
(512) 912-7011 or (800) 792-1112
or
U.S. Fish and Wildlife Service
Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, Texas 78758
(512) 490-0057
or
National Audubon Society
P.O. Box 5052
Brownsville, Texas 78523
(210) 541-8034

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Funds for the production of this leaflet were provided by the U.S. Fish and Wildlife Service, under Section 6 of the Endangered Species Act.

Eskimo Curlew (*Numenius borealis*)

TPWD ©

Texas Status

Endangered

U.S. Status

Endangered, Listed 3/11/1967

Description

The Eskimo curlew has warm brown feathers with white speckles. Cinnamon-colored feathers line the undersides of their wings. They have long, dark green, dark brown, or dark grey-blue legs and are about 12 inches in length.

Life History

In the mid-1800's, huge flocks of Eskimo Curlew migrated north from South America to their nesting grounds in the Alaskan and Canadian Arctic. Historic reports tell of the skies being full of Eskimo Curlews as they migrated through the prairie states and provinces. One historic report describes a single flock feeding in Nebraska that was said to have covered 40 to 50 acres of ground. During migration, they fed on grasshoppers and other insects on the grasslands of the central United States.

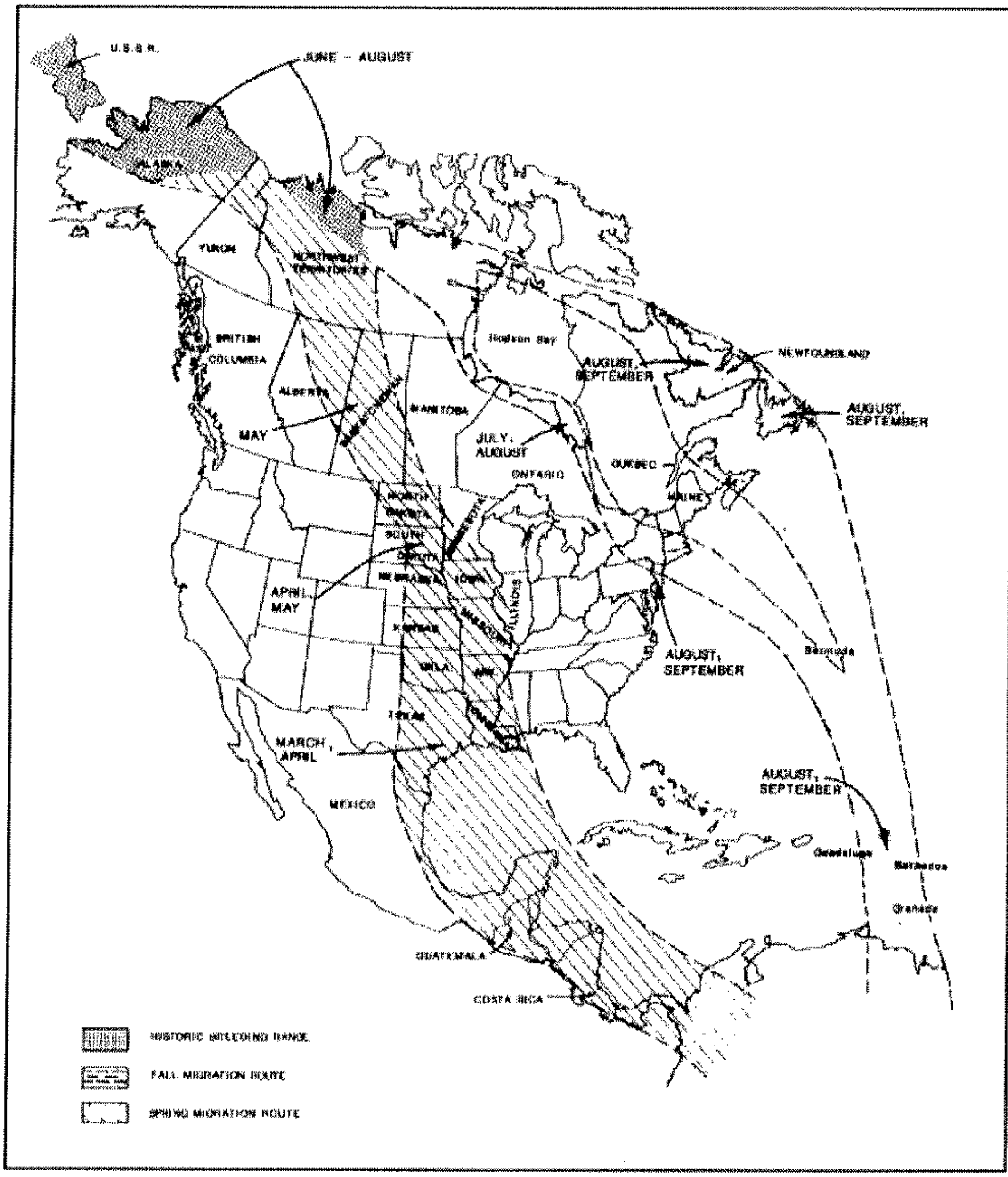
Between 1870 and 1890, unrestricted hunting rapidly reduced populations of Eskimo Curlew. Considered very good to eat, the birds were killed by thousands of market hunters, just as the Passenger Pigeon had been years earlier. The curlew's lack of fear and habit of traveling in large flocks made it an easy target.

Habitat

Arctic tundra and open grasslands provide habitat for Eskimo curlews.

Distribution

H-7



Eskimo curlews migrate from breeding grounds in the Arctic tundra through the North American prairies to wintering grounds on the Pampas grasslands of Argentina.

Other

In 1916, nongame bird hunting in the United States was stopped by the Migratory Bird Treaty Act, but the Eskimo Curlew did not recover. Conversion of native grasslands to cropland, in the South American wintering area and along the migration route through the tall grass prairies of the United States, is thought to be the reason for the birds' failure to recover.

H-8

Louisiana Black Bear

Scientific Name: *Ursus americanus luteolus*

Federal Status: Endangered, 2/17/92 • State Status: Threatened

Description

The Louisiana Black Bear is one of 16 currently recognized subspecies of American Black Bear. This subspecies is a large, bulky mammal with long black hair and a short, well-haired tail. The facial profile is rather blunt, the eyes small, and the nose pad broad with large nostrils. The muzzle is yellowish-brown with a white patch sometimes present on the lower throat and chest. There are five toes with short, curved claws on the front and hind feet. Adult males may weigh 300 to 400 pounds or more, and adult females 120 to over 180 pounds. Body length of adults ranges from 4 to 7 feet. Louisiana black bear skulls, when contrasted with other black bear skulls, are relatively long, narrow, and flat, and have proportionately large molar teeth.

Louisiana Black Bear

Distribution and Habitat

The Louisiana Black Bear was once a common inhabitant of forested regions of eastern Texas, Louisiana and Mississippi. According to the U. S. Fish and Wildlife Service Recovery Plan for the species (1995), the Louisiana Black Bear occurred in all Texas counties east of and including Cass, Marion, Harrison, Upshur, Rusk, Cherokee, Anderson, Leon, Robertson, Burleson, Washington, Lavaca, Victoria, and Refugio.

According to survey work by Bailey in 1905, black bears were considered as being rare throughout Texas at the beginning of the twentieth century. Their last strongholds in eastern Texas were in the swamps and thickets of the Big Thicket Region of southeast Texas. According to Schmidly (1983) the majority of the final remaining bears were exterminated from this area during the period between 1900, to 1940.

Presently the Louisiana black bear primarily occurs within the boundaries of the state of Louisiana. The largest concentrations are in the Atchafalaya and Tensas River Basins. There are occasional movements, primarily of solitary juvenile males, into western Mississippi, and eastern Texas. A resident breeding population does not currently exist in Mississippi or eastern Texas; however this could occur at some point in the future. Some professionals think that this subspecies may also occur in portions of southeast Arkansas. Ongoing genetics research will answer this question sometime in the near future.

Black bear populations in the neighboring states of Arkansas, Louisiana and Oklahoma are stable or increasing. Concurrently, the frequency of occurrence of black bears, primarily dispersing juvenile males, within eastern Texas is on the increase. This has been documented in the Red River and Sulphur River Basins in northeast Texas, and at other locations in eastern Texas. There have been some 24 confirmed black bear sightings within eastern Texas since 1977. There have been reliable black bear sightings in the following counties: Anderson, Angelina, Bowie, Cass, Fannin, Franklin, Harrison, Henderson, Hopkins, Jasper, Lamar, Marion, Morris, Nacogdoches, Newton, Panola, Polk, San Jacinto, and Shelby Counties. Approximately 67 percent of these sightings have occurred since 1990. Additionally, approximately 70 percent of these sightings have occurred within the northeastern counties of eastern Texas. Several of these sightings involved direct observations of a black bears, and one involved a road-killed black bear along Interstate Highway 30 east of Mount Vernon, Texas, on the Franklin-Hopkins County Line when a black bear was struck by a tractor-trailer rig in 1999.

Louisiana Black Bear (*Ursus americanus luteolus*), and American Black Bear (*U. americanus*) have been given the same protection within the historic range of the Louisiana black bear in eastern Texas, and both subspecies will essentially be treated as the *U. luteolus* subspecies. All free-ranging black bear subspecies within the historic range of Louisiana Black Bear are federally listed as threatened due to similarity in appearance, and given the same legal protection.

Key habitat requirements of black bears include food, water, cover, and denning sites spatially arranged across sufficiently large, relatively remote blocks of land. Louisiana black bears typically inhabit bottomland hardwood forests but also utilize other types of forested habitats. Other documented habitat types used include brackish and freshwater marshes, salt domes, wooded spoil levees along canals and bayous, and agricultural fields. Although black bears originally occurred throughout the lower southeastern coastal plain, bear densities were probably historically greater within bottomland hardwood and other forested communities where hard (acorns and nuts) and soft mast (berries and fleshy fruits) production was higher than in the fire-maintained, pine-dominated upland communities.

Remoteness is an important spatial feature of black bear habitat. In the southeast, remoteness is relative to forest tract size and the presence of roads. Forest tract size and the number of roads reflect the likelihood of human disturbance that can limit habitat suitability and use.

Quality cover for bedding, denning and escape is very significant as forests become smaller and more fragmented, and as human encroachment and disturbance to habitats increases. Black bears are adaptable and opportunistic, and can

survive in proximity to humans if afforded areas of retreat that minimize chance of close contact or visual encounters.

The federal listing of the Louisiana Black Bear was made without formally designating critical habitat. In addition, a special rule was included allowing for normal forest management activities to continue within the bear's range.

Life History

Although classified as carnivores, bears are not usually active predators, and have an omnivorous diet consisting primarily of vegetable matter. They are opportunistic feeders, eating almost anything that is readily available. Hard and soft masts like acorns and berries, carrion, and insect larvae found in dead and decaying wood are typical food sources. However, agricultural crops like corn, wheat and sugarcane may also be utilized. Bears are considered to be very intelligent animals. They are basically shy and secretive, and usually intentionally avoid contact with humans. Conversely, bears have a keen sense of smell, and will locate and feed on human garbage. This tendency can sometimes create problems with humans. Proper management of human garbage, making it inaccessible to bears, can minimize this problem, and is paramount to successful conservation of this species.

Males typically have larger home ranges than females, and are usually solitary except during the breeding period. The breeding period occurs during the summer. Females usually begin breeding at 3 to 4 years of age. Female black bears undergo induced ovulation and delayed implantation, and have a gestation period lasting between 7 and 8 months. Usually 1 to 3 black bear cubs are born every other year around mid-January, to mid-February. An average litter size is typically 2 cubs, but 3- to 4-cub litters are not uncommon. Cubs remain with their mother the first year, and then disperse to establish their own territories usually during their second summer. Cubs are vulnerable to a number of threats, and juvenile mortality can be high.

Threats and Reasons for Decline

Decline of this species, throughout its range, was due to depletion of populations through over harvest by humans, and to loss and fragmentation of suitable forested habitats. Presently human population density with its high potential for human/bear conflicts is probably the most significant threat. Continued alteration, conversion and fragmentation of forested habitats throughout its range, including eastern Texas, are equal, if not greater threats to the long-term survival of the species.

Recovery Efforts

The U.S. Fish and Wildlife Service (Service) formally listed the Louisiana Black Bear as threatened on February 7, 1992. The Service published the Louisiana Black Bear Recovery Plan in 1995. This plan was designed to assure long-term conservation of the black bear and its habitat within Louisiana. This plan was basically designed to maintain current black bear populations within the Atchafalaya and Tensas Basins and adjacent areas, and to create suitable bottomland hardwood habitat corridors to link these two populations. The goal is for these populations to be connected, and self-sustaining.

Field studies by the Texas Parks and Wildlife Department from 1994 through 1996 (Garner and Willis, 1998) used a Habitat Suitability Index to analyze 4 potential habitat areas in eastern Texas for suitability for black bears. Area A included a significant portion of the Sulphur River and its tributary White Oak Creek; Area B included the Middle Neches River Corridor; Area C included the Lower Neches River Corridor; and Area D included the Big Thicket National Preserve. Each of these areas provided suitable habitat and food sources, but areas A, C and D had a high occurrence of potential human/bear conflict zones. Area B, the Middle Neches River Corridor, had a much lower potential for human/bear conflicts, and was thus the most suitable potential habitat for black bears identified in the study.

Additional ongoing measures by the Department, Service and their cooperators to assure conservation of this species in eastern Texas include: (1) Minimizing loss of suitable forested habitats, particularly mature bottomland hardwood forests; (2) Promoting reforestation programs (including TPWD's Landowner Incentive Program, the U.S. Fish and Wildlife Service's Partners for Wildlife Program, East Texas Wetland Project, and numerous USDA Farm Bill Programs) that create or restore areas of new habitat for the species; (3) Monitoring and documenting movements of black bears into Texas from populations in Arkansas, Louisiana and Oklahoma; (4) Developing management strategies to protect and conserve black bears that move into Texas from bordering states (in addition to current protection by federal and state law); (5) Continuing participation in the interstate Black Bear Conservation Committee as a conservation partner for the species throughout its range; and (6) developing and implementing programs to educate the public about this species, its biology, and its management.

Department staff and a coalition of partners including state and federal agency biologists, forest products industry biologists, non-governmental conservation professionals, citizen groups, landowners and a number of private sector stakeholders are currently engaged in preparing a management plan for black bears within eastern Texas. This is an on-going process that has had, and will continue to have input from a number of stakeholders that will ultimately provide well-defined guidelines and strategies for long-term conservation of this species within the region.

In addition to the efforts previously discussed, the Black Bear Conservation Committee (BBCC), formed in 1990, is a regional non-governmental organization focused on the restoration of the Louisiana black bear throughout its historic range in Louisiana, Mississippi, and eastern Texas. The BBCC is a coalition of very diverse parties, or stakeholders with an interest in the Louisiana black bear, and has brought together people that previously had adversarial roles, and created a cooperative working environment. The BBCC, whose headquarters is in Baton Rouge, Louisiana, has been actively engaged in Louisiana black bear conservation for the past thirteen years. They have been actively working with governmental agencies, forest product companies, non-governmental organizations and private landowners

within occupied black bear habitats, and habitats that could potentially become occupied. In addition to providing direct management assistance, the BBCC spends significant energies educating the public about the plight of this threatened species. BBCC is currently engaged in the coalition to prepare a management plan for black bear in eastern Texas. In addition, the BBCC published a Black Bear Conservation Plan in 1997 to restore this species throughout its entire historic range.

Where To See Louisiana Black Bear

There are currently no well-defined populations of black bears within the boundaries of eastern Texas. Black bears in eastern Texas have largely been considered as nomadic wandering males visiting or moving in from adjacent states. A person wanting to see Louisiana black bears in the wild, a difficult task at best, would have greater chance of success by going to the Tensas River National Wildlife Refuge in Tallulah, Louisiana, or the White River National Wildlife Refuge in southeast Arkansas.

How You Can Help

There are a number of things that you can do to help with conservation of the Louisiana Black Bear in eastern Texas. First, if you own bottomland property in eastern Texas, you can conserve existing mature bottomland hardwood forest, and restore retired bottomland agricultural lands back to bottomland hardwood forests. For managed bottomland hardwood forests, creative management strategies that maintain multiple age classes of preferred hard and soft mast species through time will assure long-term habitat needs for Louisiana black bear. For adjacent slope forests, and upland forests, it is critical to leave significant streamside management zones (SMZs). These SMZs, in addition to providing food and cover for bears, can be utilized to provide corridors or linkages between areas of suitable habitats. It is of critical importance in these bottomland hardwood forests, and within these SMZs to conserve mature hardwood trees with significant hollows that could be utilized by black bears as den trees.

In addition to creation of black bear habitats through management of bottomland hardwood forests, it is important to minimize dumping of human garbage and foods near rural homes, and/or hunting camps. Bears are attracted to these areas, and can become acclimated to locating them for easy sustenance. This creates a situation that will lead bears into situations where they may actually be killed out of fear by some homeowners. In addition to problems with dumping, well-intentioned citizens, actually interested in bears near their homes, can create the same problem by actively feeding bears. The thing that must be avoided is training the bear to associate man with food. The natural fear that a bear has of man must be maintained for the safety of both the bear and man.

In addition, you can become a member of the Black Bear Conservation Committee. You can become either a supportive, or active member, and become active in the conservation of this species throughout its range.

For More Information Contact

Texas Parks and Wildlife Department
Wildlife Diversity Program
4200 Smith School Road
Austin, Texas 78744
(512) 912-7011 or (800) 792-1112
www.tpwd.state.tx.us
or
U.S. Fish and Wildlife Service
Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, Texas 78758
(512) 490-0057
www.usfws.gov
or
Black Bear Conservation Committee
P.O. Box 4125
Baton Rouge, Louisiana 70821
(504) 338-1040
www.bbcc.org

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Northern Aplomado Falcon

Scientific Name: *Falco femoralis septentrionalis*

Federal Status: Endangered, 2/26/86 • State Status: Endangered

Description

A boldly-marked, colorful Neotropical falcon that fits into the body size scale of North American falcons between the Merlin and Peregrine Falcon. Measurements are: total length 15 to 18 inches, wingspan 32 to 36 inches, and weight 7.5 to 18 ounces – similar in size to the Cooper's Hawk or American Crow. Aplomado means "steel-gray" in Spanish in reference to the adult's dorsal plumage.

Distinguishing adult field marks include bold face markings; contrasting breast, belly, and undertail plumage; relatively long wings narrowing at the body; and long tail. The face pattern consists of a blue-gray crown; broad, white eyebrow over a blue-gray eyestripe; a white cheek, and prominent, blue-gray mustache. A dark band or "cummerbund" extends across the belly separating a white breast and rich cinnamon lower belly, flanks, and undertail. Fleshy eyering and legs are yellow. In flight, the underside shows dark wing linings that are bridged by a darker cumberbund; white breast and throat; cinnamon lower belly and tail coverts; and dark tail with 6 to 8 narrow, white crossbars. Male and female are similar in appearance except that the female is noticeably larger than the male. Juveniles are similar to adults, but with white facial and breast plumage suffused with buff or cinnamon, other plumage areas not as richly colored, and the white upper breast heavily dark streaked.

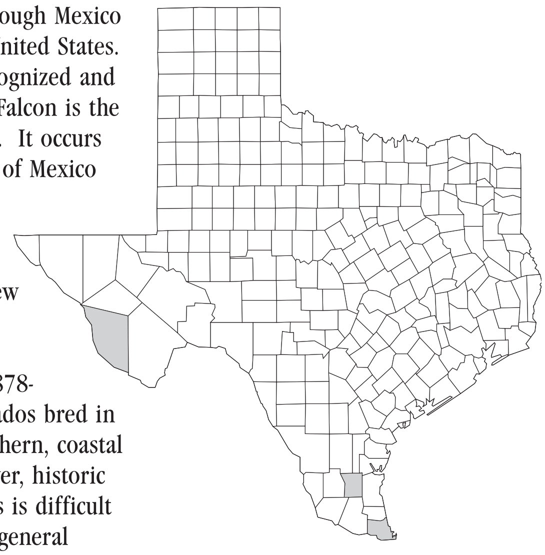
Aplomado Falcon

Distribution and Habitat

The Aplomado Falcon's Neotropical distribution extends from southern Argentina northward through Mexico in to the southwestern United States. Three subspecies are recognized and the Northern Aplomado Falcon is the northernmost subspecies. It occurs locally throughout much of Mexico and historically reached the northern limits of its range in southeastern Arizona, southern New Mexico, and western and southern Texas.

Early naturalists (1878-1925) noted that Aplomados bred in the Trans-Pecos and southern, coastal regions of Texas. However, historic status and trend in Texas is difficult to assess because of the general nature and the scarcity of historic records. In 1900, J. Strecker observed three (3) active Aplomado nests in the vicinity of Midland and stated that his collecting party "frequently" saw this bird in the Trans-Pecos. It was variously described as "locally common," "not very common," and "uncommon" in southern, coastal Texas. Aplomados declined throughout their U.S. range, including Texas, during the first half of the 20th century. The last breeding of wild birds in Texas was reported in 1941. Except for regular sightings on the King Ranch (Kleberg County) as late as the 1950s, reports of the Aplomado Falcon were extremely rare in the U.S. after the 1940s. In Mexico, however, it remains in much of its historic range.

Historically, the Aplomado Falcon occurred in two distinctly different and widely separated ecological regions in Texas. In western Texas, it was associated with open desert grasslands with scattered yuccas, mesquite, and other shrubs; or oak woodlands and gallery forests surrounded by or intermingled with desert grasslands. In southern Texas, coastal prairie and marsh habitats that supported small islands of trees and shrubs or that interfaced with woodlands along freshwater drainages and estuaries were used. In Mexico, the Aplomado is found in a broad range of semi-open tropical



and subtropical habitat settings, including coastal prairies, wetlands, savannas, and shrublands; cut-over rain forests, cleared pastureland and farmland; dry deciduous woodlands; upland pine woodlands; and open desert grasslands.

Aplomado Falcon habitat almost always contains an open grassland component with either scattered islands of shrubs or trees or woodland and forest borders. Landscapes with these open characteristics probably favor the falcon's mode of spotting, chasing, and capturing avian prey. Shrubs and trees provide perching and nesting sites and may enhance the diversity and abundance of potential prey species.

Reliable sightings of Aplomados, usually single birds, have been

reported with increasing frequency in southern New Mexico and western Texas (Jeff Davis and Culberson counties) since the 1990s. Two small breeding populations of falcons in north-central Chihuahua, Mexico, also discovered in the 1990s, were probable sources for the birds being reported in the U.S. In 2002, a pair of wild Aplomado Falcons successfully reared young near Deming, New Mexico. These events may represent the beginning of natural recolonization by Aplomados into portions of their former U.S. range. Reintroductions of captive-reared falcons have been ongoing since 1987 in southern Texas and were initiated in western Texas in 2002.

Life History

The Aplomado is an aggressive predator that feeds mainly on other birds and insects, but also takes bats, small rodents, lizards, and other animals. This falcon locates prey from observation posts or while in flight. Birds and insects may be taken on the wing or ambushed while on the ground. It aggressively chases birds even pursuing them through shrub and tree canopies and on the ground. Often mated pairs hunt cooperatively. In these instances, one bird may flush the potential prey into a position where it can be attacked by its mate. It hunts most often during daylight hours, but also before sunrise and after sunset taking advantage of crepuscular birds, bats, and insects. Aplomados practice "kleptoparasitism" – the act of commandeering prey from other raptors and predatory water birds such as herons and kingfishers. They sometimes "cache" food items for later consumption and will aggressively defend caches.

In eastern and southern Mexico, 43 bird species were preyed on by Aplomados, and birds comprised 97% of the diet by weight. Principal prey species included the Great-tailed Grackle, Mourning Dove, White-winged Dove, Grooved-billed Ani, Yellow-billed Cuckoo, meadowlarks, and Northern Bobwhite. In Chihuahua, Mexico, meadowlarks, Common Nighthawk, Western Kingbird, Brown-headed Cowbird, Mourning Dove, Cactus Wren, Pyrrhuloxia, Ash-throated Flycatcher, Blue Grosbeak, and Canyon Towhee predominated in the avian diet.

Weights of avian prey range from 0.12 ounce (hummingbird) to 19 ounces (Plain Chachalaca), but most birds taken weigh less than 3.5 ounces. Aplomados in coastal and tropical environments are highly insectivorous, but insects contribute <3% by weight to the total diet. Insect prey includes crickets, beetles, dragonflies, butterflies, cicadas, locusts, wasps, moths, bees, and others.

Like most other falcons, Aplomados are swift flyers. In full flight, they are probably slightly faster than Mourning and White-winged doves. They dive and execute aerobatic maneuvers in their pursuit of prey, but also frequently hover and soar. They are agile afoot and will chase prey in trees from limb to limb and on the ground.

The vocal repertoire of Aplomado Falcons consists of 4 distinct calls. The "kek" or "ki" call is given almost exclusively in agonistic contexts such as when adults recognize potential predators or when they are being harassed by other birds. The "chip" is given as either a single note or as a 2 to 3 note series in a wide range of contexts. "Wails" consists of a 3 to 4 note series given at the nest by the female to initiate hunting forays by the male, but also by both adults at the nest during courtship. The "chittering" note consists of 7 or more notes and is given by adults and young during feeding sessions.

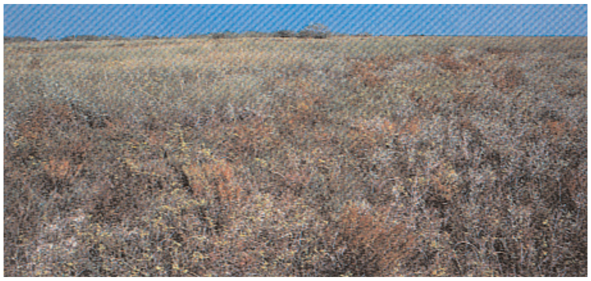
It is presumed that Aplomados are monogamous. Mated pairs remain together year-round. Pair bonding involves various courtship displays, including joint reconnaissance flights of prospective territories, perching, chasing, soaring, and diving. Males may select the nest platform and solicit the female's attention by soaring above and then landing at the nest and giving a "chip" call. Once the female joins her mate at the nest, both may give "wail" and "chip" calls, squat, and pick at nest sticks with their bills. Copulation occurs in conjunction with nest platform displays. Some evidence suggests that females are capable of breeding at 11 to 12 months of age, but typically they do not successfully breed until 2 years of age.

There is no evidence that Aplomados build their own nest, instead the pair takes over an old or newly constructed stick nest of another raptor, large jay, or raven. Aplomados may also nest in arboreal bromeliads or rarely on the ground. Egg laying usually occurs in March and April. Two to 3 eggs are laid and then cooperatively incubated for 31 to 32 days before hatching. Downy hatchlings are closely brooded by the female for the first week and less frequently thereafter. The male does the majority of the hunting for the nestlings, but may be joined by the female in this pursuit. Food items brought to the nest by the male are fed to the young by the female. Young leave the nest at 4 to 5 weeks of age and the adults continue to feed the fledglings away from the nest until their flight feathers are fully grown. Little is known about the dispersal or survival of young; although, one juvenile banded as a nestling in northern Chihuahua, Mexico, was observed approximately 180 miles away in south-central New Mexico. In eastern Mexico, 25 nests produced 38 nestlings from an estimated 66 eggs. Similarly, in Chihuahua, Mexico, 7 nests produced 11 nestlings from 18 eggs.

The population status and trend and geographic distribution of the Aplomado Falcon in the U.S. is difficult to assess because of the sparseness of historical information, the lack of recent, long-term population

Aplomado Falcon chicks
© Frid Fridrickson

Male falcon providing food
© Noel Synder



Aplomado Falcon habitat in South Texas
© USFWS Marie Fernandez

Adult Aplomado Falcon
© D. P. Keddy-Hector

monitoring efforts, and because of the remoteness and inaccessibility of the bird's habitat. In Chihuahua, Mexico, home ranges for 10 individuals ranged from 1.3 to 8.1 square miles. Causes of mortality in wild adults are not well understood. However, Brown Jays are suspected nest predators in eastern Mexico, and the Harris's Hawk and Great Horned Owl have been known to prey on released, captive-reared fledglings in southern Texas.

Threats and Reasons for Decline

The Northern Aplomado Falcon was most commonly observed and collected in its U.S. range during the period 1870-1930. The falcon seemingly disappeared in the U.S. after the 1930s for reasons that largely remain a mystery. It is noteworthy to consider that the Aplomado Falcon was at the northern limits of its continental range in southeastern Arizona, southern New Mexico, and western and southern Texas; and, therefore, possibly vulnerable to small changes in habitat quality in this region.

Severe overgrazing by domestic livestock and resultant brush encroachment in the Southwest, including Texas, has been most frequently implicated as the principal cause for the species' decline. Direct adverse effects of livestock grazing on potential falcon prey species have also been suggested as a possible cause. However, a recent review of the history of livestock trends and practices and other ecological factors in the Southwest in relation to the decline of Aplomados suggests different causes.

In the late-1800s, large numbers of cattle were introduced onto Southwest grasslands occupied by Aplomados and their numbers remained high through the 1920s. Decades of overstocking had degraded desert grasslands by the 1920s. Recognition of this led to reductions in cattle numbers by the late-1920s and 1930s, particularly after passage of the Taylor Grazing Act in 1934. However, cattle stocking rates may have remained comparatively high in western and southern Texas well into the late-1900s, since these ranges were mostly in private ownership and not subject to regulation by the federal act. At least at some Arizona and New Mexico sites where Aplomados occurred, brush did not extensively invade into grasslands until after the 1940s.

There is some evidence from early naturalists to support the notion that prairie dogs greatly expanded in the Southwest after the introduction of large cattle herds. Widespread and intensive grazing by cattle may have stimulated such an expansion, since prairie dogs require low-stature grassland habitats. Regardless of the cause, prairie dog numbers and acreages occupied were extremely high during the late-1800s through about 1920. A U.S. government campaign to control prairie dogs on publicly-owned lands in Arizona and New Mexico by use of strychnine poison began in 1912, and a similar state effort was initiated in Texas in 1915. Prairie dogs were substantially reduced through poisoning by the 1920s, their decline peaked in the 1930s, and they were virtually eliminated from southeastern Arizona and southwestern New Mexico by the 1940s and 1950s, respectively. This pattern of decline was probably mirrored in western Texas, except that prairie dogs were never completely eradicated and some populations have persisted there through the present time.

Historic ranges of the black-tailed prairie dog and the Northern Aplomado Falcon in the Southwest, to include western Texas (prairie dogs never occurred during historic time in southern Texas), matched closely. This has led to speculation that habitat conditions generated by prairie dogs may have benefited Aplomado Falcons. It is reasoned that overall abundance, biomass, and catchability of avian and small mammal prey were greater inside prairie dog towns than in the surrounding grasslands. At least some potentially important avian prey species, such as meadowlarks, some plovers, Mourning Dove, Horned Lark, and others, seem to respond positively to grazing. Others, like the Borrowing Owl, are directly dependent on prairie dog borrows and other prairie dog habitat features for optimal nesting and rearing of young. Insects, reptiles, birds, and small mammals that used prairie dog colonies were probably easier to detect and catch by Aplomados than in surrounding grasslands, where herbaceous vegetation was denser and higher. In similar ways, cattle grazing may have provided short-term benefits to Aplomados.

The natural coincidence of Aplomado and prairie dog distributions in the Southwest (outside southern Texas) and their simultaneous declines suggest that these events may have been related. Prairie dogs were eradicated by strychnine poisoning. This method of control was nonselective and undoubtedly killed other wildlife in the vicinity of dog towns. Aplomado Falcons could have been adversely affected by feeding on poisoned birds and mammals through relay toxicity. Relay toxicity also could have killed other raptors and ravens that provided nest platforms for Aplomados.

It appears that a majority of historic encounters with Aplomado Falcons and high numbers and acreage of black-tailed prairie dogs coincided with historically high livestock stocking rates on Southwest grasslands (all between 1870 and 1920). Aplomado falcons and black-tailed prairie dogs, with overlapping distributions, disappeared from the Southwest landscape in the 1930s. Although, it is clear that prairie dogs were intentionally eradicated, causes of the Aplomados disappearance remain obscure. In Arizona and New Mexico, large scale mesquite and other shrub invasion into grasslands

appears to have occurred after the demise of the falcon.

Other factors could have affected the decline. Aplomado Falcons disappeared rapidly throughout their U.S. range, which suggest that a widespread phenomenon such as climate change could have been involved. Throughout the U.S. and Mexican range of the Northern Aplomado Falcon, the long-term, cumulative impact of cattle grazing to the recovery of this subspecies probably has been negative, since it eventually contributed to the evident degradation of desert and coastal grasslands. Grazing by cattle increases the spread of mesquite, diminishes water retention on rangelands through soil compaction and loss of herbaceous plant cover, and interrupts natural fire regimes by reducing plant fuel loads. In southern Texas, relatively high numbers of falcon eggs and specimens were collected by professional collectors during the early-1900s and possibly contributed to the disappearance of Aplomados in that region. Particularly in southern Texas and eastern Mexico, but also portions of the Aplomado's former desert range, large tracts of native grassland have been converted to pasturelands and croplands, thereby further reducing the extent and quality of Aplomado Falcon habitat.

The pesticides DDT and DDE were not factors in the Alpomado's disappearance, since they were not introduced into the environment until the late-1940s. Even though these pesticides have been banned in the U.S. for over 30 years, heavy concentrations of DDT and DDE persists in potential prey species in the U.S. and northern Mexico. Furthermore, these pesticides are still in use in Mexico and other parts of Latin America. In eastern Mexico, DDT and DDE contamination has led to severe eggshell thinning in Aplomados. Birds and other organisms collected over the past decade from the lower Rio Grande, Laguna Madre, and other southern Texas locations contained heavy loads of PBCs, heavy metals, and organochlorine pesticides. Organophosphate pesticides are still heavily used throughout the range of the Aplomado Falcon, including in the U.S., and remain a serious threat to Aplomados. This group of pesticides has been linked directly to the deaths of thousands of songbirds, waterfowl, and raptors in Argentina and parts of the U.S. Other threats include direct loss of habitat from various forms of human development, secondary lead poisoning through ingestion of game birds (doves and quail), electrocution by improperly designed electrical transmission lines, and human disturbance in breeding areas.

Recovery Efforts

In 1986, the Northern Aplomado Falcon was federally listed as endangered in the U.S. and Mexico based on evidence of population declines in the U.S. and threats to reproduction in eastern Mexico related to pesticide contamination. Subsequently, the northern subspecies was state-listed as endangered in Arizona, New Mexico, and Texas, and in 1990 a federal recovery plan was prepared.

In the years since listing occurred, general awareness of the Aplomado's peril has grown, surveillance of the falcon has increased, consideration of and planning for Aplomado habitat requirements on public lands has improved; and new research, focused on the Aplomado's population ecology and habitat preferences and requirements, has been initiated. In 1992, two small, isolated populations of Aplomados were discovered in north-central Chihuahua, Mexico in close proximity to the U.S. Ongoing monitoring and research efforts at these sites are providing important insights into the desert grassland ecology of this species. Recently, another research-management effort led by U.S. departments of Interior and Defense characterized occupied Aplomado Falcon habitat in northern Mexico and then used that habitat "footprint" to identify potentially suitable falcon habitat in the U.S. The Turner Endangered Species Fund also recently funded a historical review of land use and ecological conditions that surrounded the Aplomado in the Southwest at the time of its decline.

Reintroduction of captive-reared Aplomados into the historic U.S. range was considered an essential step in the 1990 federal recovery plan. As early as 1977, the Chihuahuan Desert Institute at Alpine, Texas had begun a captive breeding program based on wild- captured Aplomado breeding stock from south-

Aplomado Falcon landing
© TPWD Glen Mills

eastern Mexico. In the 1980s, this program was taken over and expanded by The Peregrine Fund, a private organization focused on the worldwide conservation of birds of prey, with support from the U.S. Fish and Wildlife Service. An initial release of captive-reared young was made on the King Ranch in Kleberg County, Texas in 1985. Additional release sites on the Texas Gulf Coast were evaluated between 1985 and 1987, and the release program was then refocused to Laguna Atascosa National Wildlife Refuge and Matagorda Island. The first breeding in the wild of released captive-reared Aplomados occurred in 1995. Since 1997, over 100 captive-reared young have been released annually along the Texas Gulf Coast. To date, this program has resulted in the establishment of at least 37 Aplomado pairs that have produced over 92 young in the wild. In 2002, reintroductions were expanded to desert grasslands in western Texas with the release of 36 captive-reared young and future releases are being planned for southern New Mexico. The preliminary results of the reintroduction program look promising; ultimately, however, its success will depend on the quality of these environments to support wild Aplomado Falcons over time.

Where To See Aplomado Falcons

At the present time, the only publicly-accessible location in the U.S. where Aplomado Falcons can be consistently observed is in the vicinity of Laguna Atascosa National Wildlife Refuge near Rio Hondo, Texas. Opportunities to regularly see Aplomados may gradually increase with time in western Texas in the vicinity of Marfa and

Valentine as result of The Peregrine Fund's ongoing reintroduction efforts there. Wild Aplomados, presumably dispersing from Chihuahua, Mexico, also were sporadically reported during the 1990s in western Texas.

Birders who pursue opportunities to view an Aplomado Falcon should be equipped with a good quality binocular, bird identification guide, and lots of patience. Becoming familiar with the different raptor body forms, styles of flight, behaviors, and distinguishing field marks well before going into the field will greatly aid accurate identification of Aplomados and other raptors. Desert grasslands with scattered yuccas and other shrubs in western Texas and coastal grasslands and wetlands in southern Texas are the correct general habitat types for searches. Prime periods of Aplomado activity are two to three hours after sunrise and before sunset. If a visit to Laguna Atascosa National Wildlife Refuge is planned, call ahead to the refuge headquarters to obtain current information concerning viewing and reporting guidelines as well as the whereabouts and habits of this falcon. Nature and birding club web sites, local birding experts, and wildlife agency personnel are excellent sources of information regarding the locations of past and recent rare bird sightings in Texas.

How You Can Help

Aplomados can be sensitive to human disturbance, especially during the breeding season. Human activity, including close or prolonged intrusion in a bird's territory, or loud and unusual noises, can cause nest abandonment. Human intrusions can also make Aplomados more susceptible to detection and harm from potential predators. A safe viewing distance is 200 yards or more. Suitable viewing at this or greater distance may require a spotting scope with 10 to 15 X or greater magnification. Birders should always respect private property rights in Texas regardless of the species being pursued.

Birders should keep in mind that Aplomados remain extremely rare in Texas and are federally- and state-listed as endangered. Therefore, all reasonable and suspected sightings of this bird should be reported immediately to an expert birder, Texas Parks and Wildlife Department, or the U.S. Fish and Wildlife Service for further verification. Observations should include a detailed description of the bird's location, appearance, activity, and surroundings. Verification of sightings is extremely important in the context of the Aplomado's scarcity and future conservation.

Ultimately, recovery of Aplomados in Texas will depend on the interest and direct involvement of private land owners since lands within the falcon's former range are mostly in private ownership. Texas land holders interested in promoting Aplomado Falcon conservation measures should consult with experts in the Texas Parks and Wildlife Department, U.S. Fish and Wildlife Service, or The Peregrine Fund for technical guidance and other assistance. Texans can contribute to nongame wildlife resources conservation by supporting the Texas Parks and Wildlife Department's "Special Nongame and Endangered Species Conservation Fund" and by purchases of special nongame decals and stamps issued by the department. A set portion of the revenues generated by these programs is used to purchase endangered species habitats and to support the publication of nongame-wildlife informational materials and other nongame activities.

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U.S. Fish and Wildlife Service
Corpus Christi Ecological Services Office
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(956) 748-3607
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The Peregrine Fund
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Boise, Idaho 83709
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Ocelot

Scientific Name: *Leopardus pardalis*

Federal Status: Endangered, 3/30/72 • State Status: Endangered

Description

The Ocelot is a beautiful medium-sized spotted cat with body dimensions similar to the bobcat (30-41 inches long and 15-30 lbs). Its body coloration is variable; with the upper parts gray or buff with dark brown or black spots, small rings, blotches, and short bars. A key feature is the parallel stripes running down the nape of the neck. The under parts are white spotted with black. The Ocelot's long tail is ringed or marked with dark bars on the upper surface. The backs of the rounded ears are black with a white central spot.

Ocelot
© USFWS Tom Smylie

Ocelot kittens
© USFWS Linda Laack

Habitat

In Texas, Ocelots occur in the dense thorny shrub lands of the Lower Rio Grande Valley and Rio Grande Plains. Deep, fertile clay or loamy soils are generally needed to produce suitable habitat. Typical habitat consists of mixed brush species such as spiny hackberry, brasil, desert yaupon, wolfberry, lotebush, amargosa, white-brush, catclaw, blackbrush, lantana, guayacan, cenizo, elbowbush, and Texas persimmon. Interspersed trees such as mesquite, live oak, ebony, and hackberry may also occur.

Canopy cover and density of shrubs are important considerations in identifying suitable habitat. Optimal habitat has at least 95% canopy cover of shrubs, whereas marginal habitat has 75-95% canopy cover. Shrub density below the six foot level is the most important component of Ocelot habitat. Shrub density should be such that the depth of vision from outside the brush line is restricted to about five feet. Because of the density of brush below the six foot level, human movement within the brush stand would often be restricted to crawling.

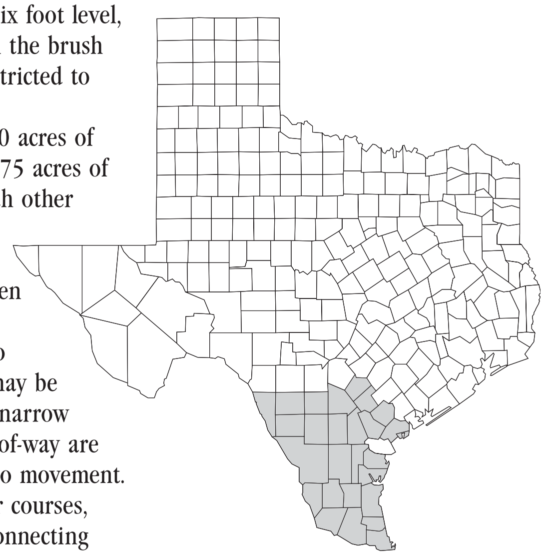
Tracts of at least 100 acres of isolated dense brush, or 75 acres of brush interconnected with other habitat tracts by brush corridors, are considered very important. Even brush tracts as small as 5 acres, when adjacent to larger areas of habitat, may be used by Ocelots. Roads, narrow water bodies, and rights-of-way are not considered barriers to movement. Brushy fence lines, water courses, and other brush strips connecting areas of habitat are very important.

Historical records indicate that the Ocelot once occurred throughout south Texas, the southern Edwards Plateau Region, and along the Coastal Plain. Over the years, the Ocelot population declined primarily due to loss of habitat and predator control activities. Today, Texas counties that contain areas identified as occupied habitat are: Cameron, Duval, Hidalgo, Jim Wells, Kenedy, Kleberg, Live Oak, McMullen, Nueces, San Patricio, Starr, Willacy, and Zapata.

Life History

Ocelots normally begin their activities at dusk, when they set out on nightly hunts for rabbits, small rodents, and birds. They move around during the night, usually within a well-established home range (area of activity) of one to two square miles for females and three to four square miles for males. Most mornings they bed down in a different spot within the territory. Male Ocelots tend to travel more than females. Males generally cover an extensive area in a short time, whereas females cover less area but use the home range more intensively.

Female Ocelots occupy a den for their kittens in thick brush or dense bunchgrass areas surrounded by brush. The den is often a slight depression with the dead leaves and mulch scraped away. The usual litter size is one or two kittens. The



mother goes off to hunt at night, but spends each day at the den site. The kittens begin to accompany their mother on hunts at about 3 months of age. They stay with her until they are about a year old. Studies have shown that kittens are born from late spring through December.

Threats and Reasons for Decline

Historically, the South Texas Plains supported grassland or savanna-type climax vegetation with dense mixed brush along dry washes and flood plains of the Rio Grande. The extensive shrub lands of the Lower Rio Grande Valley have been converted to agriculture and urban development

over the past 60 years. Much of this land, particularly the more fertile soils, has been cleared for production of vegetables, citrus, sugarcane, cotton, and other crops. Unfortunately for the Ocelot, the best soil types also grow the thickest brush and thus produce the best habitat. Less than 5% of the original vegetation remains in the Rio Grande Valley.

Only about 1% of the South Texas area supports what is currently defined as optimal habitat. Most of this habitat occurs in scattered patches probably too small to support Ocelots for extended periods. As a result, young cats dispersing from areas of suitable habitat have no place to go and most are probably hit by cars or die of disease or starvation. Road mortality is a more recent reason for decline. As Ocelot habitat in South Texas becomes fragmented by bigger highways with faster traffic, Ocelots have become increasingly vulnerable to being struck by vehicles while crossing roads. About half of the Ocelot mortality documented in the past 20 years has been from road mortality.

The Ocelot population in Texas is very small, probably no more than 80 to 120 individuals. Approximately 30 to 35 live in the chaparral remaining at or near the Laguna Atascosa National Wildlife Refuge. Unless vigorous conservation measures are taken soon, this beautiful cat may join the list of species extirpated from the United States.

Recovery Efforts

Much information has been obtained recently concerning Ocelot biology in south Texas. However, there is still much to be learned regarding reproduction, rearing of young, dispersal, home range, and movements. Efforts to inform landowners and the public about the habitat needs, land management options, and biology of the Ocelot are critical to recovery.

Conservation of remaining habitat, and maintenance or creation of brush corridors connecting these habitats, is necessary for survival of the Ocelot population in Texas. The U.S. Fish and Wildlife Service, Texas Parks and Wildlife Department, The Nature Conservancy, and many local landowners have been working to protect, acquire and restore Ocelot habitat in the Rio Grande Valley. Restoration generally involves revegetating previously cleared areas with native trees and shrubs.

The U.S. Fish and Wildlife Service and the Texas Department of Transportation are also working together to try and reduce Ocelot road mortality by installing Ocelot underpasses under roads where Ocelots are known to frequently cross.

Where To Learn More About Ocelots

The best places to visit to learn more about the Ocelot are the Laguna Atascosa National Wildlife Refuge near Rio Hondo (956) 748-3607, Santa Ana National Wildlife Refuge near Alamo (956) 787-3079, Bentsen-Rio Grande Valley State Park near Mission (956) 585-1107, Las Palomas Wildlife Management Area near Edinburg (956) 447-2704, and Audubon's Sabal Palm Grove Sanctuary near Brownsville (956) 541-8034.

How You Can Help

You can be involved with the conservation of Texas' nongame wildlife resources by supporting the Special Nongame and Endangered Species Conservation Fund. Special nongame stamps and decals are available at Texas Parks and Wildlife Department (TPWD) field offices, most state parks, and the License Branch of TPWD headquarters in Austin.
The Feline Research Program at the Caesar Kleberg Wildlife Research Institute (Texas A&M University-Kingsville) also accepts contributions to its Cat Conservation Fund. These funds are dedicated to the research and recovery of free-ranging wild cats of Texas. For more information, contact the Feline Research Program at (361) 593-3922.

The non-profit group, Friends of Laguna Atascosa Refuge, has an Adopt-an-Ocelot program in which 100% of the donated funds go towards ocelot conservation. For a small donation, participants receive an adoption packet that includes life histories and pictures of ocelots living at Laguna Atascosa National Wildlife Refuge, ocelot facts, and an adoption certificate. To learn more, contact Linda Laack at (956) 748-3607 or write Adopt-an-Ocelot, P.O. Box 942, Rio Hondo, Texas 78583.

The public is asked to report sightings of Ocelots to the Feline Research Program, Texas Parks and Wildlife Department, or U.S. Fish and Wildlife Service. Be sure to note tail length, size, color, habitat, behavior, location, date, and time of day seen.

Sub-tropical forest habitat
© TPWD

Habitat loss in the Lower Rio Grande Valley
© TPWD Bill Reaves

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Ecological Services – LRGV Office
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Management guidelines are available from the Texas Parks and Wildlife Department or U.S. Fish and Wildlife Service for landowners and managers wishing to conserve and improve habitat for the Ocelot.

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Piping Plover

Scientific Name: *Charadrius melodus*

Federal Status: Threatened in Northern Great Plains and Atlantic Coast, endangered in Great Lakes. • State Status: Threatened

Description

The Piping Plover is a small, stocky shorebird about 7 inches long with a wingspan of about 15 inches. Adults have a sand-colored upper body, white undersides, and orange legs throughout the year. A white rump, which is visible in flight, distinguishes this species from other small plovers. During the breeding season, adults acquire a dark narrow breast band, a dark strip across the forehead, and a black-tipped orange bill. The breast band is sometimes incomplete, especially in females. Juveniles are similar to nonbreeding adults in appearance.

Piping Plover

Although post-breeding birds lose the dark bands and orange bills, they can be distinguished from Snowy Plovers (*Charadrius alexandrinus*) by their shorter bill and bright orange legs. Compared with the Semipalmated Plover (*Charadrius semipalmatus*), the Piping Plover's back is paler and more sand-colored.

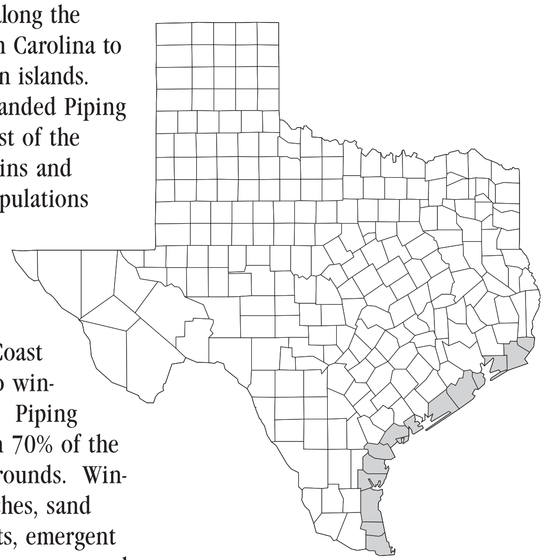
Distribution and Habitat

The Piping Plover is a migratory North American shorebird. Historically, Piping Plovers were common in certain habitats along the Atlantic and Gulf coasts, along the river systems and lakes of the Northern Great Plains and Great Lakes region, and in the Bahamas and West Indies. Although populations have been drastically reduced, remnant populations occur throughout the historic range. Currently, Piping Plovers breed on sandy beaches along the Atlantic Coast from Canada to North Carolina, along the sand and gravel shores of Lakes Michigan, Huron and Superior in Michigan, and along Lakes Superior and Michigan in Wisconsin, and on river sandbars and islands, barren shorelines of inland lakes, and alkali wetlands in the northern Great Plains of Canada and the United States. They winter primarily along Gulf Coast beaches from Florida to Mexico, along the Atlantic Coast from North Carolina to Florida, and on Caribbean islands.

Sightings of color-banded Piping Plovers indicate that most of the birds from the Great Plains and Great Lakes breeding populations spend the winter along the Gulf Coast and adjacent barrier islands. However, some birds from the Atlantic Coast breeding population also winter along the Gulf Coast. Piping Plovers spend more than 70% of the year on the wintering grounds. Winter habitat includes beaches, sand flats, mudflats, algal mats, emergent sea grass beds, wash-over passes, and very small dunes where seaweed (*Sargassum*) or other debris has accumulated sand. Spoil islands along the Intracoastal Waterway are also used by wintering plovers. Texas is estimated to winter more than 35% of the known population of Piping Plovers.

Wintering Piping Plovers in Texas prefer bare or very sparsely vegetated tidal mudflats, sand flats, or algal flats – areas which are periodically covered with water and then exposed either by tides or wind. The soft sand or mud is rich with polychaete worms, a primary food of Piping Plovers. The extensive wind-tidal flats in the Laguna Madre of the lower coast are often covered with blue-green algae, which supports large numbers of insects and other invertebrates eaten by plovers. Tidal flats formed at the base of jetties and tidal passes are also important feeding areas, especially along the upper Texas coast. Piping Plovers also feed on beaches, especially when high tides cover the flats.

Piping Plovers often roost on beaches huddled down in the sand, or behind driftwood or clumps of seaweed and other debris. They also roost among debris in wash-over passes created by hurricanes and storms on barrier islands and peninsulas.



Life History

Piping Plovers spend about 3 to 4 months on their breeding grounds in the northern United States and southern Canada, including St. Pierre and Miquelon off the coast of Newfoundland. They begin arriving from the wintering areas in mid-April. Courtship behavior includes aerial flights, digging of several nest scrapes, and ritualized stone tossing. Piping Plovers are monogamous, but mate-switching may occur both during the breeding season and between years.

Plover nests are shallow depressions in the sand, frequently lined with small pebbles or shell fragments. The nest cups are about an inch deep

and 2.5 inches in diameter. Females lay 4 eggs, which are gray to pale sand-colored with a few dark spots. The eggs blend almost perfectly with the sand, making them very difficult to see. Both parents incubate the eggs for about 27 days. Most adults raise only one brood per year, and occasionally they will renest if their nest is destroyed.

Eggs begin to hatch from late May to mid-June. The chicks can feed themselves within hours after hatching. Both parents attend the young. Broods generally remain on the nesting territory, expanding their movements as they mature or are disturbed. The young are able to fly about 30 to 35 days after hatching. Females commonly leave broods when the young are 14 to 20 days of age, but males often remain with them until after they have reached flight age.

The Piping Plover's activity (home range) during the breeding season is limited to the section of lakeshore or beach on which the nest is located. Both adults defend an area (territory) surrounding the nest against intruders. This territory sometimes includes their foraging area. Plovers in some areas defend both nesting and feeding territories. Piping Plovers commonly nest in association with Least Terns, Arctic Terns, Common Terns, Killdeer and American Avocets. Adults begin migrating south from the breeding grounds by July or early August. Adult females begin leaving the breeding grounds first, followed by adult males. Juveniles leave a few weeks later, and most are gone by late August. Although little is known of their migration, it is believed that they generally migrate non-stop from the breeding grounds to the wintering grounds.

Piping Plovers generally begin arriving on the Texas coast in mid-July. The number of plovers appears to increase on the Texas coast through October. Plovers begin migrating towards the breeding grounds in late February. Most birds are gone from Texas by mid May, although a few birds can be found along the coast year round. Birds found on the Texas coast during the breeding season may be adults, but are non-breeders. When the plovers are on the wintering grounds, the numbers of plovers that are detected is generally correlated with seasonal high tides. Seasonal high tides cover extensive flats that would otherwise be available to the birds during periods of low tide, pushing foraging plovers into areas that are more visible to the public and researchers.

Sightings of banded Piping Plovers on the wintering grounds suggest that they show some site fidelity, returning to the same stretch of beach year after year. On the lower Texas coast, individual plovers are known to use areas about 3,000 acres in size, moving 2 miles or more between foraging sites as tidal movements shift the availability of productive tidal flats.

On the wintering grounds, the diet of the Piping Plover consists of marine worms, flies, beetles, spiders, crustaceans, mollusks, and other small marine animals and their eggs and larvae. Plovers are visual predators. Therefore, they feed primarily during the day, but may also feed at night, during full moons. They often run short distances, pausing to stare at the sand with a slightly tilted head, before picking a food item from the substrate. Plovers feed most aggressively during the falling tide, when the availability of exposed mud flats is greatest. When foraging on tidal flats, Piping Plovers are often observed in flocks. These flocks are sometimes large (200 or more birds), but are usually much smaller (5-30 birds). When foraging on beaches, individual plovers are usually distributed along the beach at intervals, and occasionally have aggressive encounters with other shorebirds or other members of their own species.

When not feeding, plovers rest and preen. Piping Plovers roost on beaches, in wash-over passes, or on tidal flats, often near the areas where they forage. They usually roost in spots somewhat sheltered by driftwood, accumulations of seaweed or sea grass, other debris, or small dunes. Plovers often roost together in small flocks. When roosting, Piping Plovers can be very difficult to see.

During the wintering period on the Texas coast, Piping Plovers are often seen with other shorebirds. These associated species include the Snowy, Semipalmated, Wilson's, and Black-bellied Plovers; American

Wintering habitat along the Texas coast
© TPWD Leroy Williamson

Feeding
© TPWD Glen Mills

Resting
© Greg W. Lasley

Oystercatcher, American Avocet, Willet, Marbled Godwit, Ruddy Turnstone, Sanderling, Dowitchers, Dunlin, and Sandpipers.

Threats and Reasons for Decline

Habitat alteration and destruction are the primary causes for the decline of the Piping Plover. Loss of sandy beaches and lakeshores due to recreational, residential, and commercial development has reduced available habitat on the Great Lakes, Atlantic Coast, and the Gulf of Mexico. Reservoir construction, channel excavation, and modification of river flows have eliminated sandbar nesting habitat along hundreds of miles of the Missouri and Platte Rivers. Winter habitats along the Gulf coast are threatened by industrial and urban expansion and maintenance activities for commercial waterways. Pollution

Residential development along the Gulf coast
© Leroy Williamson

Recreational use of beach habitat
© Phil Glass

from spills of petrochemical products and other hazardous materials is also a concern.

On the breeding grounds, reproductive success can be curtailed by human disturbance. Vehicular and foot traffic destroys eggs and chicks. The presence of people on beaches and sandbar islands inhibits incubation and other breeding behavior. Changes in land use such as agricultural development, urbanization, and use of beaches has brought an increase in the number of unleashed pets and other predators such as gulls, skunks, and foxes.

Increased recreational use of Gulf beaches may also threaten the quality of wintering sites. Beach traffic, including vehicles and ATV's, as well as the activities of unleashed dogs, can disturb birds and degrade habitat. Beach raking, a practice associated with high recreational use, removes driftwood, seaweed, and other debris used by roosting plovers, and may disrupt nutrient cycles and remove prey organisms from foraging areas where plovers forage on the beach.

In 2001, the total population of Piping Plovers in North America was estimated to be 5,945 breeding adults. The Texas Gulf Coast had the highest wintering population, with about 1,042 individuals detected. This represents about 44% of birds detected on the wintering grounds during the 2001 International Piping Plover Census. Most of the plovers that winter on the Texas coast are found in the lower Laguna Madre, where tidal flats are extensive and productive. It is up to Texans to insure that the wintering habitat so vital to the survival of this species is protected.

Recovery Efforts

State, federal, and private organizations are collaborating to monitor Piping Plover populations and assess current and potential habitat on breeding and wintering grounds. Research concerning reproductive success, food habits, habitat selection, and limiting factors is underway. The results of these studies will help biologists develop management plans designed to benefit Piping Plovers. Protective measures, such as signs or fences, are being implemented to reduce human disturbance to breeding birds. Vegetation management, predator control, pollution abatement, and habitat creation/restoration are management strategies being used to benefit Piping Plover populations. Biologists continue to assess habitat availability and quality throughout the plover's range in Texas, and identify essential habitat for management and protection. Finally, public information campaigns concerning Piping Plover conservation are a vital part of the recovery process.

Critical habitat was designated for wintering Piping Plovers in July of 2001. This designation identifies areas that are important to the plovers on their wintering grounds, and provides the public and resource agencies with information that can be used to minimize impacts to these areas.

Where To See Piping Plovers

Piping Plovers can be seen along the Texas coast from about mid-July through April. Padre Island National Seashore, along with Galveston Island, Bryan Beach, Matagorda Island, Mustang Island, and Goose Island State Parks, are good places to visit and observe Piping Plovers and other shorebirds. The extensive tidal flats on the west side of South Padre Island, Mollie Beattie Coastal Habitat Community (near Corpus Christi), and Bolivar Flats Shorebird Sanctuary (near Galveston) are also good places to search for plovers. Look for them on large mud, sand, or algal flats, or on Gulf beaches. Since these birds are sensitive to human disturbance, they should be observed from a safe distance with binoculars or spotting scopes.

How You Can Help

Whether you enjoy fishing, boating, swimming, or viewing wildlife, please remember that your actions, especially when multiplied by thousands of other recreational users, can have an immense impact on the bays and estuaries of the Texas Coast. Responsible recreational use should include proper disposal of trash and other potential pollutants, respect for private property rights, preventing harm to plants and wildlife, and generally keeping human impacts to a minimum. Minimize driving on the beach and keep pets on a leash. Extensive driving on tidal flats on the bayside of barrier islands should also be minimized, as significant rutting can alter the habitat required by these birds. Avoid disturbance to foraging shorebirds to the greatest extent possible.

You can be involved in the conservation of Texas' nongame wildlife resources by supporting the Special Nongame and Endangered Species Conservation Fund. Special nongame stamps are available at Texas Parks and Wildlife Department (TPWD) field offices, most state parks, and the License Branch of TPWD headquarters in Austin. Conservation organizations in Texas also welcome your participation and support.

For More Information Contact

Texas Parks and Wildlife Department
Wildlife Diversity Branch
4200 Smith School Road
Austin, Texas 78744
(512) 912-7011 or (800) 792-1112
or
U.S. Fish and Wildlife Service
Corpus Christi Ecological Services Field Office
c/o TAMU-CC, Campus Box 338
6300 Ocean Drive, Room 118
Corpus Christi, Texas 78412
(361) 994-9005

For critical habitat designation info, see http://plover.fws.gov

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The Mammals of Texas - Online Edition

Red Wolf

Order Carnivora : Family Canidae : *Canis rufus* Audubon and Bachman

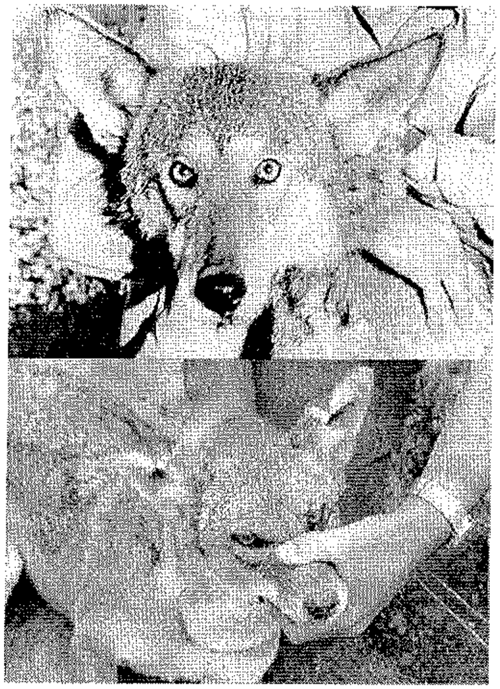
Description. A rather small, slender, long-legged wolf resembling the coyote in color but often blackish; typically larger, with wider nose pad, larger feet and coarser pelage; smaller and more tawny than the gray wolf. Dental formula as in the coyote. External measurements of an adult male: total length, 1,473 mm; tail, 362 mm; hind foot, 235 mm; a female, 1,448-355-216 mm. Large males weigh 30-40 kg; large females 20-30 kg.

MAP **Distribution in Texas.** Formerly, red wolves ranged throughout the eastern half of Texas but their numbers and range quickly declined under pressure of intensive land use in the region. Also, early lumbering and farming practices allowed the coyote to expand its range into East Texas; hybrid offspring of interbreeding red wolves and coyotes more closely resembled coyotes and the genetic identity of the red wolf was gradually suppressed.

In 1962 Howard McCarley, who had assiduously searched for them in East Texas for several years, held the opinion that they no longer occurred there. John Paradiso reported in 1965, however, that seven specimens taken near Anahuac (Chambers County) in 1963-1964, and one specimen from Armstrong (Kenedy County) taken in 1961, were definitely red wolves. All of the recent, so-called red wolves we have examined from eastern Texas have proven to be large coyotes. It appears that in Texas, red wolves are now extinct.

The following comparisons are derived mainly from a review of the status and knowledge of the red wolf prepared by G.A. Riley and R.T. McBride.

	RED WOLF	**COYOTE**
Weight (in kg): means and extremes	22.7 (17.3-34.5) Male 20.0 (16.3-24.5) Female	15.0 (10.0-16.0) Male 13.1 (9.5-15.9) Female
Total length (m)	1.42 (1.32-1.60) Male 1.34 (1.22-1.42) Female	1.27 (1.21-1.35) Male 1.20 (1.12-1.30) Female
Hind foot (cm)	23.1 (21.0-24.9) Male 22.1 (20.3-24.1) Female	20.5 (19.0-21.3) Male 19.8 (17.8-21.6) Female
Ear length (cm)	12.7 (11.4-14.0) Male 12.2 (11.4-12.7) Female	11.6 (10.7-12.2) Male 10.9 (8.6-12.2) Female
Width of nose pad (mm)	More than 25	Less than 25
Length of skull (mm)	More than 215; usually more than 220	Less than 215; usually less than 210
Tracks (back of heel pad to end of longest claw, in millimeters)	102.0 (89.0-127.0)	66.0 (57.2-72.4)
Stride (cm)	65.8 (55.8-76.2)	41.4 (32.4-48.3)
Muzzle and head	Normally broad	Normally narrow
Muzzle coloration	White area around lips may extend well up on sides of muzzle	White area around lips thin and sharply demarcated
Threat behavior (when trapped or cornered)	Tail held upright; snarl exposes only the canines and a few front teeth; ruff on neck and back raised	Tail held between legs; mouth opened wide and all teeth exposed; back arched and ruff may or or may not be raised



Red wolf (top) and Coyote (bottom). Notice the facial markings, the length of the ears and the width of the nose pad and muzzle.

Habits. Red wolves inhabited brushy and forested areas, as well as the coastal prairies. They are more sociable than coyotes. Three or more may maintain a group structure throughout the year. Riley and McBride, on the basis of systematic tracking, estimated that the home range is approximately 40-80 km^2, averaging 56 km^2.

They are known to feed on cottontails and other rabbits, deer, native rats and mice, prairie chickens, fish and crabs (along the Gulf Coast), as well as upon domestic livestock, especially free-ranging pigs. Riley and McBride list nutria (which they consider an important buffer between red wolves and domestic livestock), swamp rabbit, cottontail, rice rat, cotton rat, and muskrat as specific food items.

Breeding occurs in January and February, and the three or four pups are born in March and April. The nursery den normally is dug in the slope or crest of a low, sandy mound or hill, or in the bank of an irrigation or drainage ditch. Man-made culverts and drain pipes occasionally are utilized. The dens average about 2.4 m in length and normally are no deeper than 1 m. Den entrances vary from 60 to 75 cm in diameter and normally are well-concealed. Both sexes take part in rearing the young. Frequently, young of the previous year occur in the vicinity of a nursery den, but they do not appear to participate in guarding, feeding, or training of the pups of the year. When about 6 weeks old the pups may forsake the nursery den.

Remarks. The red wolf was apparently extinct in the wild by 1980. However, captive breeding colonies of red wolves have been established at several locations throughout the country. Beginning in 1987, red wolves were re-introduced to the Alligator River National Wildlife Refuge (ARNWR), located on an island off the coast of North Carolina. Between 1987 and 1992, 42 wolves were released in ARNWR and at least 23 wolves were born in the wild. As of August 1992, the ARNWR population numbered at least 24 wolves. Additionally, red wolf pairs have been released on Bull's Island, South Carolina, St. Vincent Island, Florida, and Horn Island, Mississippi, but breeding and survival on these islands have been limited. Most recently, red wolves have been re-introduced to the Great Smoky Mountains National Park. It is doubtful red wolves can be re-introduced in Texas because of human population pressures where they formerly occurred.

Photos courtesy of the U.S. Fish and Wildlife Service.

Whooping Crane

Scientific Name: *Grus americana*

Federal Status: Endangered, 6/2/70 • State Status: Endangered

Description

The stately Whooping Crane is the tallest bird found in North America, with males approaching nearly five feet in height. Adult birds are white overall with some red and black on the head. Their inner wing feathers droop over the rump in a "bustle" that distinguishes cranes from herons. With a seven foot wingspan and a slow wing beat, Whooping Cranes fly with their long necks and legs fully extended. When in flight, the birds' black wingtips or primary feathers

Whooping Crane
© USFWS Steve Van Riper

can be seen, and their long legs extend beyond their tail. Their dark olive-gray beaks are long and pointed. The area at the base of the beak is pink and the eyes are yellow. The Whooping Crane's call, from which it derives its name, has been described as a shrill, bugle-like trumpeting.

Whooping Crane chicks are a reddish cinnamon color. At four months of age, white feathers begin to appear on the neck and back. Juvenile feathers are replaced through the winter months. By the following spring, juvenile plumage is primarily white, with rusty colored feathers remaining only on the head, upper neck, and on the tips of wing feathers. Young birds generally have adult plumage by late in their second summer.

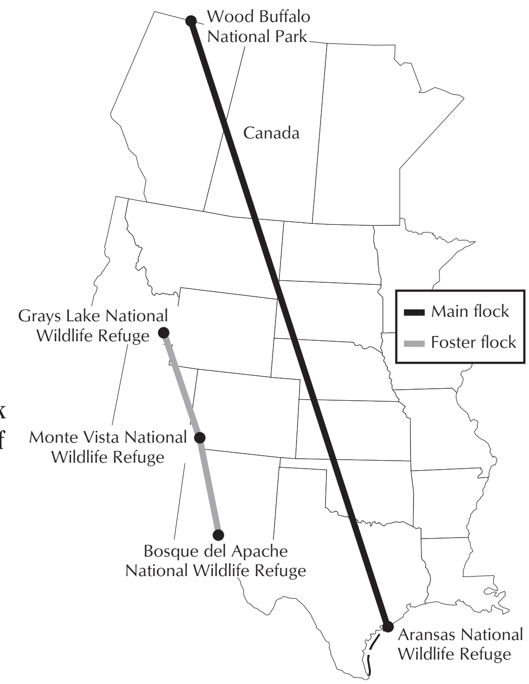
There are a number of birds that may appear similar to the Whooping Crane. The Sandhill Crane, the Whooping Crane's closest relative, is gray in color, not white. Also, Sandhill Cranes are somewhat smaller, with a wingspan of about five feet. Sandhill Cranes occur in flocks of two to hundreds, whereas Whooping Cranes are most often seen in flocks of two to as many as 10 to 15, although they sometimes migrate with Sandhill Cranes. Snow Geese and White Pelicans are white birds with black wingtips, however both of these birds have short legs that do not extend beyond the tail when in flight. In addition, Snow Geese generally occur in large flocks, are much smaller, and fly with a rapid wing beat. White Pelicans fly with their neck folded and can be distinguished by their long yellow bill. Finally, swans are all white and have short legs, and herons and egrets fly with their long necks folded.

Status and Distribution

The historical range of the Whooping Crane extended from the Arctic coast south to central Mexico, and from Utah east to New Jersey, South Carolina, Georgia, and Florida. Distribution of fossil remains suggests a wider distribution during the cooler, wetter climate of the Pleistocene.

Although once numbering above 10,000, it has been estimated that only 500 to 1,400 Whooping Cranes inhabited North America in 1870. Although the exact number is unknown, Whooping Cranes were uncommon, and their numbers had rapidly declined by the late 19th century.

In the mid 1800's, the principal breeding range extended from central Illinois northwestward through northern Iowa, western Minnesota, northeastern North Dakota, southern Manitoba and Saskatchewan, to the area near Edmonton, Alberta. The Whooping Crane disappeared from the heart of its breeding range in the north-central United States by the 1890's. The last documented nesting in southern Canada occurred in Saskatchewan in 1922. By 1937, only two small breeding populations remained; a nonmigratory population in southwestern Louisiana and a migratory population that wintered on the Aransas National Wildlife Refuge (NWR) on the Texas coast and nested in a location that at the time was unknown. The remnant population in southwestern Louisiana was reduced from 13 to 6 birds following a hurri-



cane in 1940, and the last individual was taken into captivity in 1950. In the winter of 1938-39, only 14 adult and 4 juvenile Whooping Cranes were found on the Aransas NWR. The nesting area of the Aransas Wildlife Refuge population was discovered in 1954 in Wood Buffalo National Park (NP), Northwest Territories, Canada. This population is the only historical one that survives.

Whooping Cranes currently exist in three wild populations and a breeding population kept in captivity. The species numbers approximately 420 birds, all in Canada and the United States. The only self-sustaining wild population is the one that winters on the Texas coast and nests primarily within Wood Buffalo NP. In 2002, this population consisted of 50 nesting pairs, with a total of 185 birds wintering in Texas.

In 1975, Whooping Crane eggs were transferred from Wood Buffalo NP to Grays Lake National Wildlife Refuge in Idaho and placed in Sandhill Crane nests in an effort to establish a migratory population in the Rocky Mountains. The Rocky Mountain birds spend the summer in Idaho, western Wyoming, and southwestern Montana, and winter in the middle Rio Grande Valley of New Mexico. Reintroductions ended in 1989 after the adult Whooping Cranes did not pair up or mate due to imprinting problems from their foster Sandhill Crane parents. The last Whooping Crane in the flock died in 2002.

The second persisting wild population in 2003 consisted of approximately 90 birds remaining from over 250 captive-reared Whooping Cranes released in central Florida south of Orlando beginning in 1993. These birds were released as the first step in an effort to establish a non-migratory population in Florida, and in 2002, produced the first whooping crane chick born in the wild in the United States since 1939.

The third wild population was initiated in 2001 when several young captive-reared whooping cranes were released in potential nesting habitat at Necedah National Wildlife Refuge in Wisconsin. The young birds were trained to migrate to Florida's Gulf Coast by following ultra light aircraft. Although not yet of breeding age, the birds led south in both 2001 and 2002 returned north on their own the following spring.

Habitat

Within Wood Buffalo NP, Whooping Cranes nest in poorly drained wetlands interspersed with numerous potholes (small areas of open water). These wetlands are separated by narrow ridges that support trees such as white and black spruce, tamarack, and willows, and shrubs such as dwarf birch, Labrador tea, and bearberry. Bulrush is the dominant plant in areas used by nesting birds, although cattail, sedge, musk-grass and other aquatic plants are common. Nest sites are often located in the rushes or sedges of marshes and sloughs, or along lake margins. An abundance of invertebrates, such as mollusks, crustaceans, and aquatic insects have been found in the ponds near occupied nests.

Whooping Cranes use a variety of habitats during their long migrations between northern Canada and the Texas coast. Croplands are used for feeding, and large wetland areas are used for feeding and roosting. Whooping Cranes are known to roost in riverine habitat along the Platte, Middle Loup, and Niobrara Rivers in Nebraska, Cimarron River in Oklahoma, and the Red River in Texas. The birds often roost on submerged sandbars in wide unobstructed channels isolated from human disturbance. Whooping Cranes also use large wetland areas associated with lakes for roosting and feeding during migration.

The Whooping Crane's principal wintering habitat consists of about 22,500 acres of marshes and salt flats on Aransas National Wildlife Refuge and adjacent publicly and privately owned wetlands. Plants such as salt grass, saltwort, smooth cordgrass, glasswort, and sea ox-eye dominate the outer marshes. At slightly higher elevations, Gulf cordgrass is more common. The interior portions of the refuge are characterized by oak mottes, grassland, swales, and ponds on gently rolling sandy soils. Live oak, redbay, and bluestems are typical plants found on upland sites. Upland sites have been managed using grazing, mowing, and controlled burning. About 14,250 acres of grassland are managed for cranes, waterfowl, and other wildlife.

Whooping Crane at Aransas National Wildlife Refuge
© TPWD Bill Reaves

Whooping Crane chick
© USFWS

Life History

Whooping Cranes usually mate for life, although they will remate following the death of their mate. They mature at 3 to 4 years of age, and most females are capable of producing eggs by 4 years of age. It is estimated that Whooping Cranes can live up to 22 to 24 years in the wild. Captive individuals live 30 to 40 years.

Whooping Cranes begin leaving the Texas coast in late March and early April, returning to their nesting area in Wood Buffalo NP by late April. Experienced pairs arrive first and normally nest in the same vicinity each year. Nesting territories vary considerably in size, ranging from 0.5 to 1.8 square miles. From the start of egg laying until the chicks are a few months old, the birds' activities are restricted to the breeding territory. Eggs are normally laid in late April to mid May, and

Aerial view of Aransas National Wildlife Refuge
© TPWD

Whooping Crane in flight
© TPWD Bill Reaves

hatching occurs one month later. Most nests contain 2 eggs. The eggs are light-brown or olive-buff in color with dark, purplish-brown blotches primarily at the blunt end. Whooping Cranes will occasionally renest if their first clutch is destroyed during the first half of the incubation period. They usually nest each year, but occasionally a pair will skip a nesting season for no apparent reason. When nesting conditions are unsuitable, some pairs do not attempt to nest.

Whooping Crane parents share incubation and brood-rearing duties, and one member of the pair remains on the nest at all times. Females take the primary role in feeding and caring for the young. During the first 3 or 4 days after hatching, parents and young return to the nest each night. After that, the young are protected by their parents wherever they happen to be during inclement weather or at nightfall. During the first 20 days after hatching, families generally remain within 1 mile of the nest site.

Whooping cranes feed by probing the soil with their bills or taking food items from the soil surface or vegetation. Parents feed young chicks. Summer foods include large insect nymphs or larvae, frogs, rodents, small birds, minnows, and berries.

Fall migration begins in mid-September. Whooping Cranes normally migrate as a single, pair, family group, or in small flocks, sometimes accompanying Sandhill Cranes. Flocks of up to 10 sub-adults have been observed feeding at stopover areas. Whooping Cranes migrate during the day, and make nightly stops to feed and rest. Although they use a variety of habitats during migration, they prefer isolated areas away from human disturbance.

Whooping Cranes arrive on the Texas coast between late-October and mid-December. They spend almost 6 months on the wintering grounds at and near Aransas NWR. Pairs and family groups generally occupy and defend discrete territories, although close association with other Whooping Cranes is sometimes tolerated. Juveniles stay close to their parents throughout their first winter. Recent estimates of territory size average 292 acres. Studies indicate a declining territory size as the wintering population increases. Sub adults and unpaired adults form small flocks and use areas outside occupied territories. Sub adult birds often spend the winter near the territories where they spent their first year. Also, young adult pairs will often locate their first territory near the winter territory of one of their parents.

During the wintering period on the Texas coast, Whooping Cranes eat a variety of plant and animal foods. Blue crabs, clams, and the fruits of wolfberry are predominant in the winter diet. Clams are relatively more important in the diet when water depths are low and blue crabs are less abundant. Most clams and small blue crabs (2 inches or less in width) are swallowed whole. Larger crabs are pecked into pieces before being swallowed.

Whooping Cranes feed mostly in the brackish bays, marshes, and salt flats. Occasionally, they fly to upland sites for foods such as acorns, snails, crayfish, and insects, returning to the marshes in the evening to roost. Upland sites are more attractive when they are flooded by rainfall, burned to reduce plant cover, or when food is less available in the marshes and salt flats. Some Whooping Cranes use the upland parts of the refuge occasionally in most years, but use of croplands adjacent to the refuge is rare.

As spring approaches, the courtship displays for which Whooping Cranes are famous begin. These displays include loud unison calling, wing flapping, head bowing, and leaps into the air by one or both birds, increase in frequency. These rituals serve to forge and strengthen pair bonds. Family groups and pairs usually depart first, normally between March 25 and April 15. The last birds are usually gone by May 1, but occasional stragglers may stay into mid-May. During the 16-year period between 1938 and 1992, a total of 27 birds have remained at Aransas NWR throughout the summer. Some of these birds were ill or crippled or mates of birds which were crippled.

Parents separate from their young of the previous year at the beginning of spring migration, while in route to the breeding grounds, or soon after arrival on the breeding grounds. Most juveniles spend the summer near the area where they were born.

Threats and Reasons for Decline

Whooping Cranes gradually disappeared as agriculture claimed the northern Great Plains of the United States and Canada. Man's conversion of the native prairies and potholes to pasture and crop production made much of the original habitat unsuitable for Whooping Cranes. Rural electrification brought power lines, resulting in an increase in death and serious injury due to collisions.

Human disturbance has also played a role in the decline of the Whooping Crane. The birds are wary on the breeding grounds. They will tolerate human intrusion for short intervals, but will not remain near constant human activity. The mere presence of humans during settlement of the mid-continent and coastal prairies may have interfered with the continued use of traditional breeding habitat by Whooping Cranes.

The Aransas population, the only population that is self-sustaining, remains vulnerable to accidental spills that could occur along the Gulf Intracoastal Waterway. The Intracoastal Waterway carries some of the heaviest barge traffic of any waterway in the world, and it runs right through the center of the Whooping Crane winter range. Much of the cargo is petrochemical products. Although spill response plans have been developed,

an accident resulting in a spill could potentially destroy Whooping Cranes or their food resources.

Records of Whooping Cranes known to have died from gunshot or other causes from colonial times to 1948 show that about 66% of the losses occurred during migration. Shooting represented a substantial drain on the population, particularly from 1870 to 1920. Large and conspicuous, Whooping Cranes were shot for both meat and sport. Laws enacted to protect the birds have led to a decline in human caused mortality, but shootings still occur. The most recent known cases involved an adult female being mistaken for a snow goose near Aransas NWR in 1989, an adult female shot by a vandal as she migrated northward through Texas in 1991, and two shot by a vandal in Florida in 1990.

Biological factors such as delayed sexual maturity and small clutch size prevent rapid population recovery. The major population of Whooping Cranes is now restricted to breeding grounds in northern Canada. This may hamper productivity because the ice-free season is only 4 months, barely enough time to incubate their eggs for 29 to 31 days and rear their chicks to flight age in the remaining 3 months. Unless nest loss occurs early in the incubation period, there is rarely time to successfully rear a second clutch if the first clutch fails.

Drought during the breeding season presents a serious hazard because nest site availability and food supplies are reduced and newly hatched chicks are forced to travel long distances between wetlands. Drought also increases the exposure of eggs and chicks to predators such as ravens, bears, wolverines, foxes, and wolves.

Although little is known about the importance of disease and parasites as mortality factors, there have been documented cases of wild Whooping Cranes dying of avian tuberculosis, avian cholera, and lead poisoning. Coccidia, a parasite which causes digestive tract disorder, has also been found in wild and captive birds.

Finally, Whooping Cranes are exposed to a variety of hazards and problems during their long migrations. Natural events such as snow, hail storms, low temperatures, and drought can make navigation hazardous or reduce food supplies. Collision with utility lines, predators, disease, and illegal shooting are other hazards that affect migrating cranes.

Recovery Efforts

The comeback story of the Whooping Crane has been heralded as one of the conservation victories of the 20th Century. The increase and stabilization of the Aransas/Wood Buffalo population has been a result of many factors, including legal protection, habitat protection, and biological research in both the United States and Canada.

In 1975, the U.S. Fish and Wildlife Service initiated a migration monitoring program to protect migrating Whooping Cranes from disease outbreaks and other potential hazards, and to compile information on the characteristics of stopover sites. This monitoring program is now coordinated with a network of people from the Canadian Wildlife Service, U.S. Fish and Wildlife Service, States, and Provinces along the migration corridor.

Flightless young Whooping Cranes were captured and marked with colored plastic leg bands in Wood Buffalo NP from 1977 through 1988. Of the 133 birds banded, 14% could still be identified in the spring of 2003. This marking program has provided a wealth of information on Whooping Crane biology. A radio tracking program, in which miniature radio transmitters were attached to the color leg bands of young Whooping Cranes banded at Wood Buffalo NP, has also yielded valuable information concerning migration timing and routes, stopover locations, habitat use, social behavior, daily activity, and causes of death. Recently, tests of line marking devices have identified techniques effective in reducing collisions with utility lines.

The wintering territories of Whooping Cranes on the Texas coast place the birds in close proximity to human disturbance factors such as tour boats, boat and barge traffic along the Intracoastal Waterway, recreational and commercial fishing boats, airboats, and air traffic. A number of recent and ongoing studies have addressed the issue of how human disturbance factors might affect wintering birds. Additional research studies currently underway include evaluating the relationship between freshwater inflows, blue crabs and Whooping Cranes. Significant habitat research has also been conducted on the nesting grounds in Canada.

Oil spills are a potential threat

Prescribed burning is used on Aransas NWR to reduce height and density of grasses, top kill brush, and to modify plant composition on the uplands to make them more attractive to Whooping Cranes. Burned areas are immediately used by the birds. Currently, 15 prescribed burning units averaging 1,410 acres in size are burned on a 3-year rotation.

The most complete count of the Aransas/Wood Buffalo population is made during the winter. Aerial counts are made weekly throughout the winter period, although counts are made less frequently during midwinter. These flights provide information on mortality, habitat use, pair formation, territory establishment, and age structure by identifying all color banded birds present. Additional protection of habitat outside Aransas NWR is provided by the National Audubon Society, which leases several islands from the State of Texas, by Texas Parks and Wildlife Department, and by private landowners, several of whom have signed conservation agreements to protect Whooping Cranes on their property. Monitoring of nesting pairs also takes place at Wood Buffalo NP.

Construction of the Gulf Intracoastal Waterway through the marshes of Aransas NWR in the early 1940's, and subsequent erosion by wind and boat wakes, has resulted in 11% loss of wintering habitat. Between 1989 and 1992, volunteers placed over 57,000 sacks of cement to protect 8,752 feet of shoreline. In 1992, the U.S. Army Corps of Engineers placed 2,013 feet of interlocking cement mats to stop erosion. Between 1999 and 2001, additional armoring done by the Corps protected 15.3 miles of

Erosion control efforts along the Intracoastal Waterway at Aransas National Wildlife Refuge
© TPWD

shoreline within critical habitat of the Whooping Crane.

Dredged material deposited from periodic maintenance of the Intracoastal Waterway has destroyed some marsh areas and unintentionally created others. In 1991, Mitchell Energy and Development Corporation built a dike around 10 acres of open shallow bay, filled the area with dredge material, and planted it to wetland vegetation. Whooping Cranes began using the area the following winter. In 1993 and 1995, Mitchell Energy built 20 more acres of marsh adjacent to the first area. In 1995, the Corps of Engineers created nearly 50 acres of marsh. The Corps has plans to create an additional 1,500 acres of marsh using dredged material beneficially over the next 50 years.

Several efforts have been initiated to establish new populations of Whooping Cranes as a means of safeguarding the species against a catastrophe in the Aransas/Wood Buffalo population. The effort in Idaho used Sandhill Cranes as foster parents to incubate Whooping Crane eggs, raise the chicks, and teach them migration paths to New Mexico. Foster-parenting has proved to be an unsuitable technique, however, as imprinting led to problems for the Whoopers in establishing pair bonds. An effort in Florida is using techniques developed successfully with the endangered Mississippi Sandhill Crane to try to establish a non-migratory flock of Whooping Cranes. Meanwhile, new techniques for establishing a second migratory population continue to be explored. In 2001 and 2002, 23 Whooping Crane chicks were costume-raised and flown behind an ultralight aircraft from Wisconsin to Florida. In the spring of 2003, the 16 surviving birds led south by ultralight returned to their summer reintroduction site on their own.

These reintroduction efforts have been made possible by a successful captive breeding program for Whooping Cranes. Although Whoopers at Wood Buffalo NP lay two eggs, usually only one hatches. In most years between 1967 and 1996, biologists from the United States and Canada collected eggs from wild nests in order to establish captive populations and support reintroduction efforts. Three primary captive breeding facilities exist, including Patuxent Wildlife Research Center in Maryland, the International Crane Foundation in Wisconsin, and Calgary Zoo in Alberta, Canada. Additional breeding cranes are kept at the San Antonio Zoo, Texas, and the Audubon Center for Research on Endangered Species in Louisiana.

Finally, there is much evidence that people value Whooping Cranes. Numerous books, magazine articles, television programs, and nature documentary films have been produced about this magnificent bird. Each year 70,000 to 80,000 people visit Aransas NWR, most during the winter. These visitors spend a significant amount of money locally on lodging, gasoline, and supplies. In 2003, three large tour boats operating out of Rockport/Fulton offered trips to view Whooping Cranes along the Gulf Intracoastal Waterway. Approximately 10,000 people took these tours, paying an average of $30 per ticket, for a total seasonal amount of $300,000. The city of Rockport estimates that wildlife-related activities result in annual gross economic benefits of $6 million to the local economy. Some of these benefits result from the nearby presence of Whooping Cranes. The possibility of sighting Whooping Cranes, along with large numbers of migrating Sandhill Cranes, is an additional attraction to tourists in other areas of the United States. For example, approximately 80,000 people visit the Platte River area of Nebraska each year during the peak of spring crane migrations, spending approximately $15 million. The Chamber of Commerce of Grand Island, Nebraska has responded by sponsoring an annual festival, “Wings over the Platte,” to further promote this interest in birds.

Where To See Whooping Cranes

Visit Aransas National Wildlife Refuge near Austwell, Texas during November through March to see Whooping Cranes as well as migratory waterfowl and other wildlife. As mentioned above, there are a number of commercially operated boat tours, departing from both Rockport/Fulton and Port Aransas which offer visitors the chance for a close look at Whooping Cranes, waterfowl, shorebirds, herons, and hawks. Contact Aransas NWR (361) 286-3559, Rockport/Fulton Chamber of Commerce (800) 242-0071, or Port Aransas Chamber of Commerce (800) 452-6278 for more information. Also, the San Antonio Zoo exhibits captive Whooping Cranes as part of the recovery effort.

How You Can Help

Whooping Cranes migrate over north and east-central Texas on their way to and from Aransas NWR each fall and spring. The birds are particularly vulnerable to human disturbance and other hazards during this migration period. They sometimes stop in fields or wetlands near rivers or lakes to feed or rest. If you see migrating Whooping Cranes, view them from a distance and be careful not to disturb them. Report sightings to the Texas Parks and Wildlife Department (webcomments@tpwd.state.tx.us or 1-800-792-1112) or the U.S. Fish and Wildlife Service. Remember that harassing, shooting, or attempting to capture a Whooping Crane is a violation of Federal Law. If you find a dead or injured bird, report it immediately to one of the numbers listed below or to your local game warden. Since injured Whooping Cranes are delicate and require special care, you should quickly contact a representative of Texas Parks and Wildlife or U.S. Fish and Wildlife and carefully follow their instructions.

You can be involved in the conservation of Texas' nongame wildlife resources by supporting the Special Nongame and Endangered Species Conservation Fund. Special nongame stamps and decals are available at Texas Parks and Wildlife Department (TPWD) Field Offices, most State Parks, and the License Branch of TPWD headquarters in Austin. Some of the proceeds from the sale of these items are used to conserve habitat and provide information concerning rare and endangered species. Conservation organizations such as the Whooping Crane Conservation Associ-

ation, National Audubon Society, International Crane Foundation, and The Nature Conservancy of Texas also welcome your participation and support.

For More Information Contact

Texas Parks and Wildlife Department
Wildlife Diversity Branch
4200 Smith School Road
Austin, Texas 78744
(512) 912-7011 or (800) 792-1112
or
U.S. Fish and Wildlife Service
Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, Texas 78758
(512) 490-0057
or
U.S. Fish and Wildlife Service
Corpus Christi Ecological Services Field Office
c/o TAMU-CC, Campus Box 338
6300 Ocean Drive, Room 118
Corpus Christi, Texas 78412
(361) 994-9005
or
Aransas National Wildlife Refuge
P.O. Box 100
Austwell, Texas 77950
(361) 286-3559

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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Description of BMPs

EROSION CONTROL BMPs

Temporary Vegetation

Description: Vegetation can be used as a temporary or permanent stabilization technique for areas disturbed by construction. Vegetation effectively reduces erosion in swales, stockpiles, berms, mild to medium slopes, and along roadways. Other techniques such as matting, mulches, and grading may be required to assist in the establishment of vegetation.

Materials:

- The type of temporary vegetation used on a site is a function of the season and the availability of water for irrigation.
- Temporary vegetation should be selected appropriately for the area.
- County agricultural extension agents are a good source for suggestions for temporary vegetation.
- All seed should be high quality, U.S. Dept. of Agriculture certified seed.

Installation:

- Grading must be completed prior to seeding.
- Slopes should be minimized.
- Erosion control structures should be installed.
- Seedbeds should be well pulverized, loose, and uniform.
- Fertilizers should be applied at appropriate rates.
- Seeding rates should be applied as recommended by the county agricultural extension agent.
- The seed should be applied uniformly.
- Steep slopes should covered with appropriate soil stabilization matting.

Blankets and Matting

Description: Blankets and matting material can be used as an aid to control erosion on critical sites during the establishment period of protective vegetation. The most common uses are in channels, interceptor swales, diversion dikes, short, steep slopes, and on tidal or stream banks.

Materials:

New types of blankets and matting materials are continuously being developed. The Texas Department of Transportation (TxDOT) has defined the critical performance factors for these types of products and has established minimum performance standards which must be met for any product seeking to be approved for use within any of TxDOT's construction or maintenance activities. The products that have been approved by TxDOT are also appropriate for general construction site stabilization. TxDOT maintains a web site at http://www.dot.state.tx.us/insdtdot/orgchart/cmd/erosion/contents.httm which is updated as new products are evaluated.

Installation:

- Install in accordance with the manufacturer's recommendations.
- Proper anchoring of the material.
- Prepare a friable seed bed relatively free from clods and rocks and any foreign material.
- Fertilize and seed in accordance with seeding or other type of planting plan.
- Erosion stops should extend beyond the channel liner to full design cross-section of the channel.
- A uniform trench perpendicular to line of flow may be dug with a spade or a mechanical trencher.
- Erosion stops should be deep enough to penetrate solid material or below level of ruling in sandy soils.
- Erosion stop mats should be wide enough to allow turnover at bottom of trench for stapling, while maintaining the top edge flush with channel surface.

Mulch

Description: Mulching is the process of applying a material to the exposed soil surface to protect it from erosive forces and to conserve soil moisture until plants can become established. When seeding critical sites, sites with adverse soil conditions or seeding on other than optimum seeding dates, mulch material should be applied immediately after seeding. Seeding during optimum seeding dates and with favorable soils and site conditions will not need to be mulched.

Materials:

- Mulch may be small grain straw which should be applied uniformly.
- On slopes 15 percent or greater, a binding chemical must be applied to the surface.

- Wood-fiber or paper-fiber mulch may be applied by hydroseeding.
- Mulch nettings may be used.
- Wood chips may be used where appropriate.

Installation:

Mulch anchoring should be accomplished immediately after mulch placement. This may be done by one of the following methods: peg and twine, mulch netting, mulch anchoring tool, or liquid mulch binders.

<u>Sod</u>

Description: Sod is appropriate for disturbed areas which require immediate vegetative covers, or where sodding is preferred to other means of grass establishment. Locations particularly suited to stabilization with sod are waterways carrying intermittent flow, areas around drop inlets or in grassed swales, and residential or commercial lawns where quick use or aesthetics are factors. Sod is composed of living plants and those plants must receive adequate care in order to provide vegetative stabilization on a disturbed area.

Materials:

- Sod should be machine cut at a uniform soil thickness.
- Pieces of sod should be cut to the supplier's standard width and length.
- Torn or uneven pads are not acceptable.
- Sections of sod should be strong enough to support their own weight and retain their size and shape when suspended from a firm grasp.
- Sod should be harvested, delivered, and installed within a period of 36 hours.

Installation:

- Areas to be sodded should be brought to final grade.
- The surface should be cleared of all trash and debris.
- Fertilize according to soil tests.
- Fertilizer should be worked into the soil.
- Sod should not be cut or laid in excessively wet or dry weather.
- Sod should not be laid on soil surfaces that are frozen.
- During periods of high temperature, the soil should be lightly irrigated.

• The first row of sod should be laid in a straight line with subsequent rows placed parallel to and butting tightly against each other.

• Lateral joints should be staggered to promote more uniform growth and strength.

• Wherever erosion may be a problem, sod should be laid with staggered joints and secured.

• Sod should be installed with the length perpendicular to the slope (on the contour).

• Sod should be rolled or tamped.

• Sod should be irrigated to a sufficient depth.

• Watering should be performed as often as necessary to maintain soil moisture.

• The first mowing should not be attempted until the sod is firmly rooted.

• Not more than one third of the grass leaf should be removed at any one cutting.

Interceptor Swale

Interceptor swales are used to shorten the length of exposed slope by intercepting runoff, prevent off-site runoff from entering the disturbed area, and prevent sediment-laden runoff from leaving a disturbed site. They may have a v-shape or be trapezodial with a flat bottom and side slopes of 3:1 or flatter. The outflow from a swale should be directed to a stabilized outlet or sediment trapping device. The swales should remain in place until the disturbed area is permanently stabilized.

Materials:

• Stabilization should consist of a layer of crushed stone three inches thick, riprap or high velocity erosion control mats.

• Stone stabilization should be used when grades exceed 2% or velocities exceed 6 feet per second.

• Stabilization should extend across the bottom of the swale and up both sides of the channel to a minimum height of three inches above the design water surface elevation based on a 2-year, 24-hour storm.

Installation:

• An interceptor swale should be installed across exposed slopes during construction and should intercept no more than 5 acres of runoff.

• All earth removed and not needed in construction should be disposed of in an approved spoils site so that it will not interfere with the functioning of the swale or contribute to siltation in other areas of the site.

• All trees, brush, stumps, obstructions and other material should be removed and disposed of so as not to interfere with the proper functioning of the swale.

• Swales should have a maximum depth of 1.5 feet with side slopes of 3:1 or flatter. Swales should have positive drainage for the entire length to an outlet.

• When the slope exceeds 2 percent, or velocities exceed 6 feet per second (regardless of slope), stabilization is required. Stabilization should be crushed stone placed in a layer of at least 3 inches thick or may be high velocity erosion control matting. Check dams are also recommended to reduce velocities in the swales possibly reducing the amount of stabilization necessary.

• Minimum compaction for the swale should be 90% standard proctor density.

<u>**Diversion Dikes**</u>

A temporary diversion dike is a barrier created by the placement of an earthen embankment to reroute the flow of runoff to an erosion control device or away from an open, easily erodible area. A diversion dike intercepts runoff from small upland areas and diverts it away from exposed slopes to a stabilized outlet, such as a rock berm, sandbag berm, or stone outlet structure. These controls can be used on the perimeter of the site to prevent runoff from entering the construction area. Dikes are generally used for the duration of construction to intercept and reroute runoff from disturbed areas to prevent excessive erosion until permanent drainage features are installed and/or slopes are stabilized.

Materials:

• Stone stabilization (required for velocities in excess of 6 fps) should consist of riprap placed in a layer at least 3 inches thick and should extend a minimum height of 3 inches above the design water surface up the existing slope and the upstream face of the dike.

• Geotextile fabric should be a non-woven polypropylene fabric designed specifically for use as a soil filtration media with an approximate weight of 6 oz./yd^2, a Mullen burst rating of 140 psi, and having an equivalent opening size (EOS) greater than a #50 sieve.

Installation:

• Diversion dikes should be installed prior to and maintained for the duration of construction and should intercept no more than 10 acres of runoff.

• Dikes should have a minimum top width of 2 feet and a minimum height of compacted fill of 18 inches measured form the top of the existing ground at the upslope toe to top of the dike and have side slopes of 3:1 or flatter.

• The soil for the dike should be placed in lifts of 8 inches or less and be compacted to 95 % standard proctor density.

• The channel, which is formed by the dike, must have positive drainage for its entire length to an outlet.

• When the slope exceeds 2 percent, or velocities exceed 6 feet per second (regardless of slope), stabilization is required. In situations where velocities do not exceed 6 feet per second, vegetation may be used to control erosion.

Erosion Control Compost

Description: Erosion control compost (ECC) can be used as an aid to control erosion on critical sites during the establishment period of protective vegetation. The most common uses are on steep slopes, swales, diversion dikes, and on tidal or stream banks.

Materials:

New types of erosion control compost are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Material used within any TxDOT construction or maintenance activities must meet material specifications in accordance with current TxDOT specifications. TxDOT maintains a website at http://www.dot.state.tx.us/des/landscape/compost/specifications.htm that provides information on compost specification data. This website also contains information on areas where the Texas Commission on Environmental Quality (TCEQ) restricts the use of certain compost products.

ECC used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used as an ECC, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission (now named TCEQ) Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for ECC to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

Installation:

- Install in accordance with current TxDOT specification.
- Use on slopes 3:1 or flatter.
- Apply a 2 inch uniform layer unless otherwise shown on the plans or as directed.

• When rolling is specified, use a light corrugated drum roller.

Mulch Filter Berms and Socks

Description: Mulch filter berms and socks are used to intercept and detain sediment laden run-off from unprotected areas. When properly used, mulch filter berms and socks can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond which allows heavier solids to settle. Mulch filter berms and socks are used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. The berm or sock should remain in place until the area is permanently stabilized. Mulch filter berms should not be used when there is a concentration of water in a channel or drainage way. If concentrated flows occurs after installation, corrective action must be taken. Mulch filter socks may be installed in construction areas and temporarily moved during the day to allow construction activity provided it is replaced and properly anchored at the end of the day. Mulch filter berms and socks may be seeded to allow for quick vegetative growth and reduction in run-off velocity.

Materials:

New types of mulch filter berms and socks are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Mulch filter berms and socks used within any TxDOT construction or maintenance activities must meet material specifications in accordance with current TxDOT specifications. TxDOT maintains a website at http://www.dot.state.tx.us/des/landscape/compost/specifications.htm that provides information on compost specification data. This website also contains information on areas where the Texas Commission on Environmental Quality (TCEQ) restricts the use of certain compost products.

Mulch filter berms and socks used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used for mulch filter berms and socks, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for mulch filter berms and socks to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at

http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

Installation:

- Install in accordance with current TxDOT specification.

- Mulch filter berms should be constructed at 1-1/2 feet high and 3 foot wide at locations shown on plans.

- Routinely inspect and maintain filter berm in a functional condition at all times. Correct deficiencies immediately. Install additional filter berm material as directed. Remove sediment after it has reached 1/3 of the height of the berm. Disperse filter berm or leave in place as directed.

- Mulch filter socks should be in 8 inch, 12 inch or 18 inch or as directed. Sock materials should be designed to allow for proper percolation through.

Compost Filter Berms and Socks

Description: Compost filter berms and socks are used to intercept and detain sediment laden run-off from unprotected areas. When properly used, compost filter berms and socks can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond which allows heavier solids to settle. Compost filter berms and socks are used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. The berm or sock should remain in place until the area is permanently stabilized. Compost filter berms should not be used when there is a concentration of water in a channel or drainage way. If concentrated flows occur after installation , corrective action must be taken. Compost filter socks may be installed in construction areas and temporality moved during the day to allow construction activity provided it is replaced and properly anchored at the end of the day. Compost filter berms and socks may be seeded to allow for quick vegetative growth and reduction in run-off velocity.

Materials:

New types of compost filter berms and socks are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Compost filter berms and socks used within any TxDOT construction or maintenance activities must meet material specifications in accordance with TxDOT specification 1059. TxDOT maintains a website at http://www.dot.state.tx.us/des/landscape/compost/specifications.htm that provides information on compost specification data. This website also contains information on areas where the Texas Commission on Environmental Quality (TCEQ) restricts the use of certain compost products.

Compost filter berms and socks used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used as compost filter berms and socks, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission (now named TCEQ) Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products

outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for compost filter berms and socks to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

Installation:

- Install in accordance with TxDOT Special Specification 1059.

- Compost filter berms shall be constructed at 1-1/2 feet high and 3 foot wide at locations shown on plans.

- Routinely inspect and maintain filter berm in a functional condition at all times. Correct deficiencies immediately. Install additional filter berm material as directed. Remove sediment after it has reached 1/3 of the height of the berm. Disperse filter berm or leave in place as directed.

- Compost filter socks shall be in 8 inch, 12 inch or 18 inch or as directed. Sock materials shall be designed allowing for proper percolation through.

SEDIMENT CONTROL BMPS

Sand Bag Berm

Description: The purpose of a sandbag berm is to detain sediment carried in runoff from disturbed areas. This objective is accomplished by intercepting runoff and causing it to pool behind the sand bag berm. Sediment carried in the runoff is deposited on the upstream side of the sand bag berm due to the reduced flow velocity. Excess runoff volumes are allowed to flow over the top of the sand bag berm. Sand bag berms are used only during construction activities in streambeds when the contributing drainage area is between 5 and 10 acres and the slope is less than 15%, i.e., utility construction in channels, temporary channel crossing for construction equipment, etc. Plastic facing should be installed on the upstream side and the berm should be anchored to the streambed by drilling into the rock and driving in "T" posts or rebar (#5 or #6) spaced appropriately.

Materials:

- The sand bag material should be polypropylene, polyethylene, polyamide or cotton burlap woven fabric, minimum unit weight 4 oz/yd 2, mullen burst strength exceeding 300 psi and ultraviolet stability exceeding 70 percent.

- The bag length should be 24 to 30 inches, width should be 16 to 18 inches and thickness should be 6 to 8 inches.

- Sandbags should be filled with coarse grade sand and free from deleterious material. All sand should pass through a No. 10 sieve. The filled bag should have an approximate weight of 40 pounds.

- Outlet pipe should be schedule 40 or stronger polyvinyl chloride (PVC) having a nominal internal diameter of 4 inches.

Installation:

- The berm should be a minimum height of 18 inches, measured from the top of the existing ground at the upslope toe to the top of the berm.

- The berm should be sized as shown in the plans but should have a minimum width of 48 inches measured at the bottom of the berm and 16 inches measured at the top of the berm.

- Runoff water should flow over the tops of the sandbags or through 4-inch diameter PVC pipes embedded below the top layer of bags.

- When a sandbag is filled with material, the open end of the sandbag should be stapled or tied with nylon or poly cord.

- Sandbags should be stacked in at least three rows abutting each other, and in staggered arrangement.

- The base of the berm should have at least 3 sandbags. These can be reduced to 2 and 1 bag in the second and third rows respectively.

- For each additional 6 inches of height, an additional sandbag must be added to each row width.

• A bypass pump-around system, or similar alternative, should be used on conjunction with the berm for effective dewatering of the work area.

Silt Fence

Description: A silt fence is a barrier consisting of geotextile fabric supported by metal posts to prevent soil and sediment loss from a site. When properly used, silt fences can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond which allows heavier solids to settle. If not properly installed, silt fences are not likely to be effective. The purpose of a silt fence is to intercept and detain water-borne sediment from unprotected areas of a limited extent. Silt fence is used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. This fence should remain in place until the disturbed area is permanently stabilized. Silt fence should not be used where there is a concentration of water in a channel or drainage way. If concentrated flow occurs after installation, corrective action must be taken such as placing a rock berm in the areas of concentrated flow. Silt fencing within the site may be temporarily moved during the day to allow construction activity provided it is replaced and properly anchored to the ground at the end of the day. Silt fences on the perimeter of the site or around drainage ways should not be moved at any time.

Materials:

• Silt fence material should be polypropylene, polyethylene or polyamide woven or nonwoven fabric. The fabric width should be 36 inches, with a minimum unit weight of 4.5 oz/yd, mullen burst strength exceeding 190 lb/in 2 , ultraviolet stability exceeding 70%, and minimum apparent opening size of U.S. Sieve No. 30.

• Fence posts should be made of hot rolled steel, at least 4 feet long with Tee or Y-bar cross section, surface painted or galvanized, minimum nominal weight 1.25 lb/ft 2, and Brindell hardness exceeding 140.

• Woven wire backing to support the fabric should be galvanized 2” x 4” welded wire, 12 gauge minimum.

Installation:

• Steel posts, which support the silt fence, should be installed on a slight angle toward the anticipated runoff source. Post must be embedded a minimum of 1 foot deep and spaced not more than 8 feet on center. Where water concentrates, the maximum spacing should be 6 feet.

• Lay out fencing down-slope of disturbed area, following the contour as closely as possible. The fence should be sited so that the maximum drainage area is ¼ acre/100 feet of fence.

• The toe of the silt fence should be trenched in with a spade or mechanical trencher, so that the down-slope face of the trench is flat and perpendicular to the line of flow. Where fence cannot be trenched in (e.g., pavement or rock outcrop), weight fabric flap with 3 inches of pea gravel on uphill side to prevent flow from seeping under fence.

• The trench must be a minimum of 6 inches deep and 6 inches wide to allow for the silt fence fabric to be laid in the ground and backfilled with compacted material.

• Silt fence should be securely fastened to each steel support post or to woven wire, which is in turn attached to the steel fence post. There should be a 3-foot overlap, securely fastened where ends of fabric meet.

Triangular Filter Dike

Description: The purpose of a triangular sediment filter dike is to intercept and detain water-borne sediment from unprotected areas of limited extent. The triangular sediment filter dike is used where there is no concentration of water in a channel or other drainage way above the barrier and the contributing drainage area is less than one acre. If the uphill slope above the dike exceeds 10%, the length of the slope above the dike should be less than 50 feet. If concentrated flow occurs after installation, corrective action should be taken such as placing rock berm in the areas of concentrated flow. This measure is effective on paved areas where installation of silt fence is not possible or where vehicle access must be maintained. The advantage of these controls is the ease with which they can be moved to allow vehicle traffic and then reinstalled to maintain sediment

Materials:

- Silt fence material should be polypropylene, polyethylene or polyamide woven or nonwoven fabric. The fabric width should be 36 inches, with a minimum unit weight of 4.5 oz/yd, mullen burst strength exceeding 190 lb/in 2 , ultraviolet stability exceeding 70%, and minimum apparent opening size of U.S. Sieve No. 30.

- The dike structure should be 6 gauge 6" x 6" wire mesh folded into triangular form being eighteen (18) inches on each side.

Installation:

- The frame of the triangular sediment filter dike should be constructed of 6" x 6", 6 gauge welded wire mesh, 18 inches per side, and wrapped with geotextile fabric the same composition as that used for silt fences.

- Filter material should lap over ends six (6) inches to cover dike to dike junction; each junction should be secured by shoat rings.

- Position dike parallel to the contours, with the end of each section closely abutting the adjacent sections.

- There are several options for fastening the filter dike to the ground. The fabric skirt may be toed-in with 6 inches of compacted material, or 12 inches of the fabric skirt should extend uphill and be secured with a minimum of 3 inches of open graded rock, or with staples or nails. If these two options are not feasible the dike structure may be trenched in 4 inches.

- Triangular sediment filter dikes should be installed across exposed slopes during construction with ends of the dike tied into existing grades to prevent failure and should intercept no more than one acre of runoff.

- When moved to allow vehicular access, the dikes should be reinstalled as soon as possible, but always at the end of the workday.

Rock Berm

Description: The purpose of a rock berm is to serve as a check dam in areas of concentrated flow, to intercept sediment-laden runoff, detain the sediment and release the water in sheet flow. The rock berm should be used when the contributing drainage area is less than 5 acres. Rock berms are used in areas where the volume of runoff is too great for a silt fence to contain. They are less effective for sediment removal than

silt fences, particularly for fine particles, but are able to withstand higher flows than a silt fence. As such, rock berms are often used in areas of channel flows (ditches, gullies, etc.). Rock berms are most effective at reducing bed load in channels and should not be substituted for other erosion and sediment control measures further up the watershed.

Materials:

- The berm structure should be secured with a woven wire sheathing having maximum opening of 1 inch and a minimum wire diameter of 20 gauge galvanized and should be secured with shoat rings.

- Clean, open graded 3- to 5-inch diameter rock should be used, except in areas where high velocities or large volumes of flow are expected, where 5- to 8-inch diameter rocks may be used.

Installation:

- Lay out the woven wire sheathing perpendicular to the flow line. The sheathing should be 20 gauge woven wire mesh with 1 inch openings.

- Berm should have a top width of 2 feet minimum with side slopes being 2:1 (H:V) or flatter.

- Place the rock along the sheathing to a height not less than 18".

- Wrap the wire sheathing around the rock and secure with tie wire so that the ends of the sheathing overlap at least 2 inches, and the berm retains its shape when walked upon.

- Berm should be built along the contour at zero percent grade or as near as possible.

- The ends of the berm should be tied into existing upslope grade and the berm should be buried in a trench approximately 3 to 4 inches deep to prevent failure of the control.

<u>**Hay Bale Dike**</u>

Description: The purpose of a hay or straw bale dike is to intercept and detain small amounts of sediment-laden runoff from relatively small unprotected areas. Straw bales are to be used when it is not feasible to install other, more effective measures or when the construction phase is expected to last less than 3 months. Straw bales should not be used on areas where rock or other hard surfaces prevent the full and uniform anchoring of the barrier.

Materials:

Straw: The best quality straw mulch comes from wheat, oats or barley and should be free of weed and grass seed which may not be desired vegetation for the area to be protected. Straw mulch is light and therefore must be properly anchored to the ground.

Hay: This is very similar to straw with the exception that it is made of grasses and weeds and not grain stems. This form of mulch is very inexpensive and is widely available but does introduce weed and grass seed to the area. Like straw, hay is light and must be anchored.

- Straw bales should weigh a minimum of 50 pounds and should be at least 30 inches long.

- Bales should be composed entirely of vegetable matter and be free of seeds.

- Binding should be either wire or nylon string, jute or cotton binding is unacceptable. Bales should be used for not more than two months before being replaced.

Installation:

- Bales should be embedded a minimum of 4 inches and securely anchored using 2” x 2” wood stakes or 3/8” diameter rebar driven through the bales into the ground a minimum of 6 inches.

- Bales are to be placed directly adjacent to one another leaving no gap between them.

- All bales should be placed on the contour.

- The first stake in each bale should be angled toward the previously laid bale to force the bales together.

Brush Berms

Organic litter and spoil material from site clearing operations is usually burned or hauled away to be dumped elsewhere. Much of this material can be used effectively on the construction site itself. The key to constructing an efficient brush berm is in the method used to obtain and place the brush. It will not be acceptable to simply take a bulldozer and push whole trees into a pile. This method does not assure continuous ground contact with the berm and will allow uncontrolled flows under the berm.

Brush berms may be used where there is little or no concentration of water in a channel or other drainage way above the berm. The size of the drainage area should be no greater than one-fourth of an acre per 100 feet of barrier length; the maximum slope length behind the barrier should not exceed 100 feet; and the maximum slope gradient behind the barrier should be less than 50 percent (2:1).

Materials:

- The brush should consist of woody brush and branches, preferably less than 2 inches in diameter.

- The filter fabric should conform to the specifications for filter fence fabric.

- The rope should be ¼ inch polypropylene or nylon rope.

- The anchors should be 3/8-inch diameter rebar stakes that are 18-inches long.

Installation:

- Lay out the brush berm following the contour as closely as possible.

- The juniper limbs should be cut and hand placed with the vegetated part of the limb in close contact with the ground. Each subsequent branch should overlap the previous branch providing a shingle effect.

• The brush berm should be constructed in lifts with each layer extending the entire length of the berm before the next layer is started.

• A trench should be excavated 6-inches wide and 4-inches deep along the length of the barrier and immediately uphill from the barrier.

• The filter fabric should be cut into lengths sufficient to lay across the barrier from its up-slope base to just beyond its peak. The lengths of filter fabric should be draped across the width of the barrier with the uphill edge placed in the trench and the edges of adjacent pieces overlapping each other. Where joints are necessary, the fabric should be spliced together with a minimum 6-inch overlap and securely sealed.

• The trench should be backfilled and the soil compacted over the filter fabric.

• Set stakes into the ground along the downhill edge of the brush barrier, and anchor the fabric by tying rope from the fabric to the stakes. Drive the rope anchors into the ground at approximately a 45-degree angle to the ground on 6-foot centers.

• Fasten the rope to the anchors and tighten berm securely to the ground with a minimum tension of 50 pounds.

• The height of the brush berm should be a minimum of 24 inches after the securing ropes have been tightened.

Stone Outlet Sediment Trap

A stone outlet sediment trap is an impoundment created by the placement of an earthen and stone embankment to prevent soil and sediment loss from a site. The purpose of a sediment trap is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties and rights of way below the sediment trap from sedimentation. A sediment trap is usually installed at points of discharge from disturbed areas. The drainage area for a sediment trap is recommended to be less than 5 acres.

Larger areas should be treated using a sediment basin. A sediment trap differs from a sediment basin mainly in the type of discharge structure. The trap should be located to obtain the maximum storage benefit from the terrain, for ease of clean out and disposal of the trapped sediment and to minimize interference with construction activities. The volume of the trap should be at least 3600 cubic feet per acre of drainage area.

Materials:

• All aggregate should be at lest 3 inches in diameter and should not exceed a volume of 0.5 cubic foot.

• The geotextile fabric specification should be woven polypropylene, polyethylene or polyamide geotextile, minimum unit weight of 4.5 oz/yd 2, mullen burst strength at least 250 lb/in 2, ultraviolet stability exceeding 70%, and equivalent opening size exceeding 40.

Installation:

• Earth Embankment: Place fill material in layers not more than 8 inches in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content of the

material. Compact each layer to 95 percent standard proctor density. Do not place material on surfaces that are muddy or frozen. Side slopes for the embankment are to be 3:1. The minimum width of the embankment should be 3 feet.

• A gap is to be left in the embankment in the location where the natural confluence of runoff crosses the embankment line. The gap is to have a width in feet equal to 6 times the drainage area in acres.

• Geotextile Covered Rock Core: A core of filter stone having a minimum height of 1.5 feet and a minimum width at the base of 3 feet should be placed across the opening of the earth embankment and should be covered by geotextile fabric which should extend a minimum distance of 2 feet in either direction from the base of the filter stone core.

• Filter Stone Embankment: Filter stone should be placed over the geotextile and is to have a side slope which matches that of the earth embankment of 3:1 and should cover the geotextile/rock core a minimum of 6 inches when installation is complete. The crest of the outlet should be at least 1 foot below the top of the embankment.

Sediment Basins:

The purpose of a sediment basin is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties and rights of way below the sediment basin from sedimentation. A sediment basin is usually installed at points of discharge from disturbed areas. The drainage area for a sediment basin is recommended to be less than 100 acres.

Sediment basins are effective for capturing and slowly releasing the runoff from larger disturbed areas thereby allowing sedimentation to take place. A sediment basin can be created where a permanent pond BMP is being constructed. Guidelines for construction of the permanent BMP should be followed, but revegetation, placement of underdrain piping, and installation of sand or other filter media should not be carried out until the site construction phase is complete.

Materials:

• Riser should be corrugated metal or reinforced concrete pipe or box and should have watertight fittings or end to end connections of sections.

• An outlet pipe of corrugated metal or reinforced concrete should be attached to the riser and should have positive flow to a stabilized outlet on the downstream side of the embankment.
• An anti-vortex device and rubbish screen should be attached to the top of the riser and should be made of polyvinyl chloride or corrugated metal.

Basin Design and Construction:

• For common drainage locations that serve an area with ten or more acres disturbed at one time, a sediment basin should provide storage for a volume of runoff from a two-year, 24-hour storm from each disturbed acre drained.

• The basin length to width ratio should be at least 2:1 to improve trapping efficiency. The shape may be attained by excavation or the use of baffles. The lengths should be measured at the elevation of the riser de-

watering hole.

• Place fill material in layers not more than 8 inches in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content of the material. Compact each layer to 95 percent standard proctor density. Do not place material on surfaces that are muddy or frozen. Side slopes for the embankment should be 3:1 (H:V).

• An emergency spillway should be installed adjacent to the embankment on undisturbed soil and should be sized to carry the full amount of flow generated by a 10-year, 3-hour storm with 1 foot of freeboard less the amount which can be carried by the principal outlet control device.

• The emergency spillway should be lined with riprap as should the swale leading from the spillway to the normal watercourse at the base of the embankment.

• The principal outlet control device should consist of a rigid vertically oriented pipe or box of corrugated metal or reinforced concrete. Attached to this structure should be a horizontal pipe, which should extend through the embankment to the toe of fill to provide a de-watering outlet for the basin.

• An anti-vortex device should be attached to the inlet portion of the principal outlet control device to serve as a rubbish screen.

• A concrete base should be used to anchor the principal outlet control device and should be sized to provide a safety factor of 1.5 (downward forces = 1.5 buoyant forces).

• The basin should include a permanent stake to indicate the sediment level in the pool and marked to indicate when the sediment occupies 50% of the basin volume (not the top of the stake).

• The top of the riser pipe should remain open and be guarded with a trash rack and anti-vortex device. The top of the riser should be 12 inches below the elevation of the emergency spillway. The riser should be sized to convey the runoff from the 2-year, 3-hour storm when the water surface is at the emergency spillway elevation. For basins with no spillway the riser must be sized to convey the runoff from the 10-yr, 3-hour storm.

• Anti-seep collars should be included when soil conditions or length of service make piping through the backfill a possibility.

• The 48-hour drawdown time will be achieved by using a riser pipe perforated at the point measured from the bottom of the riser pipe equal to ½ the volume of the basin. This is the maximum sediment storage elevation. The size of the perforation may be calculated as follows:

$$A_0 = \frac{A_s \times \sqrt{2h}}{C_d \times 980{,}000}$$

Where:
A_o = Area of the de-watering hole, ft 2
As = Surface area of the basin, ft 2

Cd = Coefficient of contraction, approximately 0.6
h = head of water above the hole, ft
Perforating the riser with multiple holes with a combined surface area equal to Ao is acceptable.

Erosion Control Compost

Description: Erosion control compost (ECC) can be used as an aid to control erosion on critical sites during the establishment period of protective vegetation. The most common uses are on steep slopes, swales, diversion dikes, and on tidal or stream banks.

Materials:

New types of erosion control compost are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Material used within any TxDOT construction or maintenance activities must meet material specifications in accordance with current TxDOT specifications. TxDOT maintains a website at http://www.dot.state.tx.us/des/landscape/compost/specifications.htm that provides information on compost specification data. This website also contains information on areas where the Texas Commission on Environmental Quality (TCEQ) restricts the use of certain compost products.

ECC used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used as an ECC, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission (now named TCEQ) Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for ECC to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

Installation:

- Install in accordance with current TxDOT specification.
- Use on slopes 3:1 or flatter.
- Apply a 2 inch uniform layer unless otherwise shown on the plans or as directed.
- When rolling is specified, use a light corrugated drum roller.

Mulch Filter Berms and Socks

Description: Mulch filter berms and socks are used to intercept and detain sediment laden run-off from unprotected areas. When properly used, mulch filter berms and socks can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond which allows heavier solids to settle. Mulch filter berms and socks are used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. The berm or sock should remain in place until the area is permanently stabilized. Mulch filter berms should not be used when there is a concentration of water in a channel or drainage way. If concentrated flows occurs after installation, corrective action must be taken. Mulch filter socks may be installed in construction areas and temporarily moved during the day to allow construction activity provided it is replaced and properly anchored at the end of the day. Mulch filter berms and socks may be seeded to allow for quick vegetative growth and reduction in run-off velocity.

Materials:

New types of mulch filter berms and socks are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Mulch filter berms and socks used within any TxDOT construction or maintenance activities must meet material specifications in accordance with current TxDOT specifications. TxDOT maintains a website at http://www.dot.state.tx.us/des/landscape/compost/specifications.htm that provides information on compost specification data. This website also contains information on areas where the Texas Commission on Environmental Quality (TCEQ) restricts the use of certain compost products.

Mulch filter berms and socks used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used for mulch filter berms and socks, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of

Composting and Compost (TMECC) should be conducted on compost products used for mulch filter berms and socks to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

Installation:

- Install in accordance with current TxDOT specification.

- Mulch filter berms should be constructed at 1-1/2 feet high and 3 foot wide at locations shown on plans.

- Routinely inspect and maintain filter berm in a functional condition at all times. Correct deficiencies immediately. Install additional filter berm material as directed. Remove sediment after it has reached 1/3 of the height of the berm. Disperse filter berm or leave in place as directed.

- Mulch filter socks should be in 8 inch, 12 inch or 18 inch or as directed. Sock materials should be designed to allow for proper percolation through.

Compost Filter Berms and Socks

Description: Compost filter berms and socks are used to intercept and detain sediment laden run-off from unprotected areas. When properly used, compost filter berms and socks can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond which allows heavier solids to settle. Compost filter berms and socks are used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. The berm or sock should remain in place until the area is permanently stabilized. Compost filter berms should not be used when there is a concentration of water in a channel or drainage way. If concentrated flows occur after installation , corrective action must be taken. Compost filter socks may be installed in construction areas and temporality moved during the day to allow construction activity provided it is replaced and properly anchored at the end of the day. Compost filter berms and socks may be seeded to allow for quick vegetative growth and reduction in run-off velocity.

Materials:

New types of compost filter berms and socks are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Compost filter berms and socks used within any TxDOT construction or maintenance activities must meet material specifications in accordance with TxDOT specification 1059. TxDOT maintains a website at http://www.dot.state.tx.us/des/landscape/compost/specifications.htm that provides information on compost specification data. This website also contains information on areas where the Texas Commission on Environmental Quality (TCEQ) restricts the use of certain compost products.

Compost filter berms and socks used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used as compost filter berms and socks, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission (now named TCEQ) Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for compost filter berms and socks to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

Installation:

- Install in accordance with TxDOT Special Specification 1059.

- Compost filter berms shall be constructed at 1-1/2 feet high and 3 foot wide at locations shown on plans.

- Routinely inspect and maintain filter berm in a functional condition at all times. Correct deficiencies immediately. Install additional filter berm material as directed. Remove sediment after it has reached 1/3 of the height of the berm. Disperse filter berm or leave in place as directed.

- Compost filter socks shall be in 8 inch, 12 inch or 18 inch or as directed. Sock materials shall be designed allowing for proper percolation through.

POST-CONSTRUCTION TSS CONTROLS

Retention/Irrigation Systems

Description: Retention/irrigation systems refer to the capture of runoff in a holding pond, then use of the captured water for irrigation of appropriate landscape areas. Retention/irrigation systems are characterized by the capture and disposal of runoff without direct release of captured flow to receiving streams. Retention systems exhibit excellent pollutant removal but can require regular, proper maintenance. Collection of roof runoff for subsequent use (rainwater harvesting) also qualifies as a retention/irrigation practice, but should be operated and sized to provide adequate volume. This technology, which emphasizes beneficial use of stormwater runoff, is particularly appropriate for arid regions because of increasing demands on water supplies for agricultural irrigation and urban water supply.

Design Considerations: Retention/irrigation practices achieve 100% removal efficiency of total suspended solids contained within the volume of water captured. Design elements of retention/irrigation systems include runoff storage facility configuration and sizing, pump and wet well system components, basin lining, basin detention time, and physical and operational components of the irrigation system. Retention/irrigation systems are appropriate for large drainage areas with low to moderate slopes. The retention capacity should be sufficient considering the average rainfall event for the area.

Maintenance Requirements: Maintenance requirements for retention/irrigation systems include routine inspections, sediment removal, mowing, debris and litter removal, erosion control, and nuisance control.

Extended Detention Basin

Description: Extended detention facilities are basins that temporarily store a portion of stormwater runoff following a storm event. Extended detention basins are normally used to remove particulate pollutants and to reduce maximum runoff rates associated with development to their pre-development levels. The water quality benefits are the removal of sediment and buoyant materials. Furthermore, nutrients, heavy metals, toxic materials, and oxygen-demanding materials associated with the particles also are removed. The control of the maximum runoff rates serves to protect drainage channels below the device from erosion and to reduce downstream flooding. Although detention facilities designed for flood control have different design requirements than those used for water quality enhancement, it is possible to achieve these two objectives in a single facility.

Design Considerations: Extended detention basins can remove approximately 75% of the total suspended solids contained within the volume of runoff captured in the basin. Design elements of extended detention basins include basin sizing, basin configuration, basin side slopes, basin lining, inlet/outlet structures, and erosion controls. Extended detention basins are appropriate for large drainage areas with low to moderate slopes. The retention capacity should be sufficient considering the average rainfall event for the area.

Maintenance Requirements: Maintenance requirements for extended detention basins include routine inspections, mowing, debris and litter removal, erosion control, structural repairs, nuisance control, and sediment removal.

Vegetative Filter Strips

Description: Filter strips, also known as vegetated buffer strips, are vegetated sections of land similar to grassy swales, except they are essentially flat with low slopes, and are designed only to accept runoff as

overland sheet flow. They may appear in any vegetated form from grassland to forest, and are designed to intercept upstream flow, lower flow velocity, and spread water out as sheet flow. The dense vegetative cover facilitates conventional pollutant removal through detention, filtration by vegetation, and infiltration.

Filter strips cannot treat high velocity flows, and do not provide enough storage or infiltration to effectively reduce peak discharges to predevelopment levels for design storms. This lack of quantity control favors use in rural or low-density development; however, they can provide water quality benefits even where the impervious cover is as high as 50%. The primary highway application for vegetative filter strips is along rural roadways where runoff that would otherwise discharge directly to a receiving water, passes through the filter strip before entering a conveyance system. Properly designed roadway medians and shoulders make effective buffer strips. These devices also can be used on other types of development where land is available and hydraulic conditions are appropriate. Flat slopes and low to fair permeability of natural subsoil are required for effective performance of filter strips. Although an inexpensive control measure, they are most useful in contributing watershed areas where peak runoff velocities are low, as they are unable to treat the high flow velocities typically associated with high impervious cover. The most important criteria for selection and use of this BMP are soils, space, and slope.

Design Considerations: Vegetative filter strips can remove approximately 85% of the total suspended solids contained within the volume of runoff captured. Design elements of vegetative filter strips include uniform, shallow overland flow across the entire filter strip area, hydraulic loading rate, inlet structures, slope, and vegetative cover. The area should be free of gullies or rills which can concentrate flow. Vegetative filter strips are appropriate for small drainage areas with moderate slopes.

Maintenance Requirements: Maintenance requirements for vegetative filter strips include pest management, seasonal mowing and lawn care, routine inspections, debris and litter removal, sediment removal, and grass reseeding and mulching.

<u>Constructed Wetlands</u>

Description: Constructed wetlands provide physical, chemical, and biological water quality treatment of stormwater runoff. Physical treatment occurs as a result of decreasing flow velocities in the wetland, and is present in the form of evaporation, sedimentation, adsorption, and/or filtration. Chemical processes include chelation, precipitation, and chemical adsorption. Biological processes include decomposition, plant uptake and removal of nutrients, plus biological transformation and degradation. Hydrology is one of the most influential factors in pollutant removal due to its effects on sedimentation, aeration, biological transformation, and adsorption onto bottom sediments.

The wetland should be designed such that a minimum amount of maintenance is required. The natural surroundings, including such things as the potential energy of a stream or flooding river, should be utilized as much as possible. The wetland should approximate a natural situation and unnatural attributes, such as rectangular shape or rigid channel, should be avoided.

Site considerations should include the water table depth, soil/substrate, and space requirements. Because the wetland must have a source of flow, it is desirable that the water table is at or near the surface. If runoff is the only source of inflow for the wetland, the water level often fluctuates and establishment of vegetation may be difficult. The soil or substrate of an artificial wetland should be loose loam to clay. A perennial baseflow must be present to sustain the artificial wetland. The presence of organic material is often helpful in increasing pollutant removal and retention. A greater amount of space is required for a wetland system than is required for a detention facility treating the same amount of area.

Design Considerations: Constructed wetlands can remove over 90% of the total suspended solids contained within the volume of runoff captured in the wetland. Design elements of constructed wetlands include wetland sizing, wetland configuration, sediment forebay, vegetation, outflow structure, depth of inundation during storm events, depth of micropools, and aeration. Constructed wetlands are appropriate for large drainage areas with low to moderate slopes.

Maintenance Requirements: Maintenance requirements for constructed wetlands include mowing, routine inspections, debris and litter removal, erosion control, nuisance control, structural repairs, sediment removal, harvesting, and maintenance of water levels.

Wet Basins

Description: Wet basins are runoff control facilities that maintain a permanent wet pool and a standing crop of emergent littoral vegetation. These facilities may vary in appearance from natural ponds to enlarged, bermed (manmade) sections of drainage systems and may function as online or offline facilities, although offline configuration is preferable. Offline designs can prevent scour and other damage to the wet pond and minimize costly outflow structure elements needed to accommodate extreme runoff events.

During storm events, runoff inflows displace part or all of the existing basin volume and are retained and treated in the facility until the next storm event. The pollutant removal mechanisms are settling of solids, wetland plant uptake, and microbial degradation. When the wet basin is adequately sized, pollutant removal performance can be excellent, especially for the dissolved fraction. Wet basins also help provide erosion protection for the receiving channel by limiting peak flows during larger storm events. Wet basins are often perceived as a positive aesthetic element in a community and offer significant opportunity for creative pond configuration and landscape design. Participation of an experienced wetland designer is suggested. A significant potential drawback for wet ponds in arid climates is that the contributing watershed for these facilities is often incapable of providing an adequate water supply to maintain the permanent pool, especially during the summer months. Makeup water (i.e., well water or municipal drinking water) is sometimes used to supplement the rainfall/runoff process, especially for wet basin facilities treating watersheds that generate insufficient runoff.

Design Considerations: Wet basins can remove over 90% of the total suspended solids contained within the volume of runoff captured in the basin. Design elements of wet basins include basin sizing, basin configuration, basin side slopes, sediment forebay, inflow and outflow structures, vegetation, depth of permanent pool, aeration, and erosion control. Wet basins are appropriate for large drainage areas with low to moderate slopes.

Maintenance Requirements: Maintenance requirements for wet basins include mowing, routine inspections, debris and litter removal, erosion control, nuisance control, structural repairs, sediment removal, and harvesting.

Grassy Swales

Grassy swales are vegetated channels that convey stormwater and remove pollutants by filtration through grass and infiltration through soil. They require shallow slopes and soils that drain well. Pollutant removal capability is related to channel dimensions, longitudinal slope, and type of vegetation. Optimum design of these components will increase contact time of runoff through the swale and improve pollutant removal rates.

Grassy swales are primarily stormwater conveyance systems. They can provide sufficient control under light to moderate runoff conditions, but their ability to control large storms is limited. Therefore, they are most applicable in low to moderate sloped areas or along highway medians as an alternative to ditches and curb and gutter drainage. Their performance diminishes sharply in highly urbanized settings, and they are generally not effective enough to receive construction stage runoff where high sediment loads can overwhelm the system. Grassy swales can be used as a pretreatment measure for other downstream BMPs, such as extended detention basins. Enhanced grassy swales utilize check dams and wide depressions to increase runoff storage and promote greater settling of pollutants.

Grassy swales can be more aesthetically pleasing than concrete or rock-lined drainage systems and are generally less expensive to construct and maintain. Swales can slightly reduce impervious area and reduce the pollutant accumulation and delivery associated with curbs and gutters. The disadvantages of this technique include the possibility of erosion and channelization over time, and the need for more right-of-way as compared to a storm drain system. When properly constructed, inspected, and maintained, the life expectancy of a swale is estimated to be 20 years.

Design Considerations:

- Comparable performance to wet basins
- Limited to treating a few acres
- Availability of water during dry periods to maintain vegetation
- Sufficient available land area

The suitability of a swale at a site will depend on land use, size of the area serviced, soil type, slope, imperviousness of the contributing watershed, and dimensions and slope of the swale system. In general, swales can be used to serve areas of less than 10 acres, with slopes no greater than 5 %. The seasonal high water table should be at least 4 feet below the surface. Use of natural topographic lows is encouraged, and natural drainage courses should be regarded as significant local resources to be kept in use.

Maintenance Requirements:

Research in the Austin area indicates that vegetated controls are effective at removing pollutants even when dormant. Therefore, irrigation is not required to maintain growth during dry periods, but may be necessary only to prevent the vegetation from dying.

<u>Vegetative Filter Strips</u>

Filter strips, also known as vegetated buffer strips, are vegetated sections of land similar to grassy swales except they are essentially flat with low slopes, and are designed only to accept runoff as overland sheet flow. A schematic of a vegetated buffer strip is shown in Figure 3.3. They may appear in any vegetated form from grassland to forest, and are designed to intercept upstream flow, lower flow velocity, and spread water out as sheet flow. The dense vegetative cover facilitates conventional pollutant removal through detention, filtration by vegetation, and infiltration.

Filter strips cannot treat high velocity flows, and do not provide enough storage or infiltration to effectively reduce peak discharges to predevelopment levels for design storms. This lack of quantity control favors use

in rural or low-density development; however, they can provide water quality benefits even where the impervious cover is as high as 50%. The primary highway application for vegetative filter strips is along rural roadways where runoff that would otherwise discharge directly to a receiving water passes through the filter strip before entering a conveyance system. Properly designed roadway medians and shoulders make effective buffer strips. These devices also can be used on other types of development where land is available and hydraulic conditions are appropriate.

Flat slopes and low to fair permeability of natural subsoil are required for effective performance of filter strips. Although an inexpensive control measure, they are most useful in contributing watershed areas where peak runoff velocities are low as they are unable to treat the high flow velocities typically associated with high impervious cover.

Successful performance of filter strips relies heavily on maintaining shallow unconcentrated flow. To avoid flow channelization and maintain performance, a filter strip should:

- Be equipped with a level spreading device for even distribution of runoff
- Contain dense vegetation with a mix of erosion resistant, soil binding species
- Be graded to a uniform, even and relatively low slope
- Laterally traverse the contributing runoff area

Filter strips can be used upgradient from watercourses, wetlands, or other water bodies along toes and tops of slopes and at outlets of other stormwater management structures. They should be incorporated into street drainage and master drainage planning. The most important criteria for selection and use of this BMP are soils, space, and slope.

Design Considerations:

- Soils and moisture are adequate to grow relatively dense vegetative stands
- Sufficient space is available
- Slope is less than 12%
- Comparable performance to more expensive structural controls

Sand Filter Systems

The objective of sand filters is to remove sediment and the pollutants from the first flush of pavement and impervious area runoff. The filtration of nutrients, organics, and coliform bacteria is enhanced by a mat of bacterial slime that develops during normal operations. One of the main advantages of sand filters is their adaptability; they can be used on areas with thin soils, high evaporation rates, low-soil infiltration rates, in limited-space areas, and where groundwater is to be protected.

Since their original inception in Austin, Texas, hundreds of intermittent sand filters have been implemented to treat stormwater runoff. There have been numerous alterations or variations in the original design as engineers in other jurisdictions have improved and adapted the technology to meet their specific

requirements. Major types include the Austin Sand Filter, the District of Columbia Underground Sand Filter, the Alexandria Dry Vault Sand Filter, the Delaware Sand Filter, and peat-sand filters which are adapted to provide a sorption layer and vegetative cover to various sand filter designs .

Design Considerations:

- Appropriate for space-limited areas
- Applicable in arid climates where wet basins and constructed wetlands are not appropriate
- High TSS removal efficiency

Cost Considerations:

Filtration Systems may require less land than some other BMPs, reducing the land acquisition cost; howevr the structure itself is one of the more expensive BMPs. In addition, maintenance cost can be substantial.

<u>Erosion Control Compost</u>

Description: Erosion control compost (ECC) can be used as an aid to control erosion on critical sites during the establishment period of protective vegetation. The most common uses are on steep slopes, swales, diversion dikes, and on tidal or stream banks.

Materials:

New types of erosion control compost are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Material used within any TxDOT construction or maintenance activities must meet material specifications in accordance with current TxDOT specifications. TxDOT maintains a website at http://www.dot.state.tx.us/des/landscape/compost/specifications.htm that provides information on compost specification data. This website also contains information on areas where the Texas Commission on Environmental Quality (TCEQ) restricts the use of certain compost products.

ECC used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used as an ECC, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission (now named TCEQ) Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing

protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for ECC to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

Installation:

- Install in accordance with current TxDOT specification.
- Use on slopes 3:1 or flatter.
- Apply a 2 inch uniform layer unless otherwise shown on the plans or as directed.
- When rolling is specified, use a light corrugated drum roller.

<u>Mulch Filter Berms and Socks</u>

Description: Mulch filter berms and socks are used to intercept and detain sediment laden run-off from unprotected areas. When properly used, mulch filter berms and socks can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond which allows heavier solids to settle. Mulch filter berms and socks are used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. The berm or sock should remain in place until the area is permanently stabilized. Mulch filter berms should not be used when there is a concentration of water in a channel or drainage way. If concentrated flows occurs after installation, corrective action must be taken. Mulch filter socks may be installed in construction areas and temporarily moved during the day to allow construction activity provided it is replaced and properly anchored at the end of the day. Mulch filter berms and socks may be seeded to allow for quick vegetative growth and reduction in run-off velocity.

Materials:

New types of mulch filter berms and socks are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Mulch filter berms and socks used within any TxDOT construction or maintenance activities must meet material specifications in accordance with current TxDOT specifications. TxDOT maintains a website at http://www.dot.state.tx.us/des/landscape/compost/specifications.htm that provides information on compost specification data. This website also contains information on areas where the Texas Commission on Environmental Quality (TCEQ) restricts the use of certain compost products.

Mulch filter berms and socks used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost

used for mulch filter berms and socks, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission (now named TCEQ)Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for mulch filter berms and socks to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

Installation:

- Install in accordance with current TxDOT specification.

- Mulch filter berms should be constructed at 1-1/2 feet high and 3 foot wide at locations shown on plans.

- Routinely inspect and maintain filter berm in a functional condition at all times. Correct deficiencies immediately. Install additional filter berm material as directed. Remove sediment after it has reached 1/3 of the height of the berm. Disperse filter berm or leave in place as directed.

- Mulch filter socks should be in 8 inch, 12 inch or 18 inch or as directed. Sock materials should be designed to allow for proper percolation through.

Compost Filter Berms and Socks

Description: Compost filter berms and socks are used to intercept and detain sediment laden run-off from unprotected areas. When properly used, compost filter berms and socks can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond which allows heavier solids to settle. Compost filter berms and socks are used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. The berm or sock should remain in place until the area is permanently stabilized. Compost filter berms should not be used when there is a concentration of water in a channel or drainage way. If concentrated flows occur after installation , corrective action must be taken. Compost filter socks may be installed in construction areas and temporality moved during the day to allow construction activity provided it is replaced and properly

anchored at the end of the day. Compost filter berms and socks may be seeded to allow for quick vegetative growth and reduction in run-off velocity.

Materials:

New types of compost filter berms and socks are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Compost filter berms and socks used within any TxDOT construction or maintenance activities must meet material specifications in accordance with TxDOT specification 1059. TxDOT maintains a website at http://www.dot.state.tx.us/des/landscape/compost/specifications.htm that provides information on compost specification data. This website also contains information on areas where the Texas Commission on Environmental Quality (TCEQ) restricts the use of certain compost products.

Compost filter berms and socks used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used as compost filter berms and socks, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission (now named TCEQ) Health and Safety Regulations as defined in the Texas Administration Code (TAC), Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products used for compost filter berms and socks to ensure that the products used will not impact public health, safety, and the environment and to promote production and marketing of quality composts that meet analytical standards. TMECC is a laboratory manual that provides protocols for the composting industry and test methods for compost analysis. TMECC provides protocols to sample, monitor, and analyze materials during all stages of the composting process. Numerous parameters that might be of concern in compost can be tested by following protocols or test methods listed in TMECC. TMECC information can be found at http://www.tmecc.org/tmecc/index.html. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at http://tmecc.org/sta/STA_program_description.html.

Installation:

- Install in accordance with TxDOT Special Specification 1059.

- Compost filter berms shall be constructed at 1-1/2 feet high and 3 foot wide at locations shown on plans.

- Routinely inspect and maintain filter berm in a functional condition at all times. Correct deficiencies immediately. Install additional filter berm material as directed. Remove sediment after it has reached 1/3

of the height of the berm. Disperse filter berm or leave in place as directed.

- Compost filter socks shall be in 8 inch, 12 inch or 18 inch or as directed. Sock materials shall be designed allowing for proper percolation through.

Appendix I
Review Comment Matrix

Review Comment Matrix

Included on CD enclosed.

Appendix J
Air Emission Calculations

USAF Air Conformity Applicability Model

Emissions Summary Information

Scenario: Operations Building
Installation: AF PLANT 4

Emissions Summary Report For 2010

SOURCE CATEGORY	CO	NOX	SO2	VOC	PM10	PM2.5
	Emissions, Ton/Year					
Area Sources						
Demolition	0.00	0.00	0.00	0.00	0.10	0.00
Total	0.00	0.00	0.00	0.00	0.10	0.00
Grand Total 2010	0.00	0.00	0.00	0.00	0.10	0.00

Note: Non-Residential Architectural Coating emissions are combined across Aircraft and Non-Aircraft activities

USAF Air Conformity Applicability Model

Emissions Summary Information

Scenario: **Vehicle Maintenance**
Installation: **AF PLANT 4**

Emissions Summary Report For 2010

SOURCE CATEGORY	Emissions, Ton/Year CO	NOX	SO2	VOC	PM10	PM2.5
Area Sources						
Demolition	0.00	0.00	0.00	0.00	0.02	0.00
Total	0.00	0.00	0.00	0.00	0.02	0.00
Grand Total 2010	0.00	0.00	0.00	0.00	0.02	0.00

Note: Non-Residential Architectural Coating emissions are combined across Aircraft and Non-Aircraft activities

USAF Air Conformity Applicability Model

Emissions Summary Information

Scenario: Payload Service Building
Installation: AF PLANT 4

Emissions Summary Report For 2010

SOURCE CATEGORY	Emissions, Ton/Year CO	NOX	SO2	VOC	PM10	PM2.5
Area Sources						
Demolition	0.00	0.00	0.00	0.00	0.11	0.00
Total	0.00	0.00	0.00	0.00	0.11	0.00
Grand Total 2010	0.00	0.00	0.00	0.00	0.11	0.00

Note: Non-Residential Architectural Coating emissions are combined across Aircraft and Non-Aircraft activities

USAF Air Conformity Applicability Model

Emissions Summary Information

Scenario: Security Building
Installation: AF PLANT 4

Emissions Summary Report For 2010

SOURCE CATEGORY	CO	NOX	SO2	VOC	PM10	PM2.5
	Emissions, Ton/Year					
Area Sources						
Demolition	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00
Grand Total 2010	0.00	0.00	0.00	0.00	0.00	0.00

Note: Non-Residential Architectural Coating emissions are combined across Aircraft and Non-Aircraft activities

USAF Air Conformity Applicability Model

Emissions Summary Information

Scenario: Mechanical Building
Installation: AF PLANT 4

Emissions Summary Report For 2010

SOURCE CATEGORY	CO	NOX	SO2	VOC	PM10	PM2.5
	Emissions, Ton/Year					
Area Sources						
Demolition	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00
Grand Total 2010	0.00	0.00	0.00	0.00	0.00	0.00

Note: Non-Residential Architectural Coating emissions are combined across Aircraft and Non-Aircraft activities

USAF Air Conformity Applicability Model

Emissions Summary Information

Scenario: Hazardous Waste Building
Installation: AF PLANT 4

Emissions Summary Report For 2010

	Emissions, Ton/Year					
SOURCE CATEGORY	**CO**	**NOX**	**SO2**	**VOC**	**PM10**	**PM2.5**
Area Sources						
Demolition	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00
Grand Total 2010	0.00	0.00	0.00	0.00	0.00	0.00

Note: Non-Residential Architectural Coating emissions are combined across Aircraft and Non-Aircraft activities

Page 1 of 1

USAF Air Conformity Applicability Model

Emissions Summary Information

Scenario: Electrical Power Station Building
Installation: AF PLANT 4

Emissions Summary Report For 2010

SOURCE CATEGORY	CO	NOX	SO2	VOC	PM10	PM2.5
	Emissions, Ton/Year					
Area Sources						
Demolition	0.00	0.00	0.00	0.00	0.01	0.00
Total	0.00	0.00	0.00	0.00	0.01	0.00
Grand Total 2010	0.00	0.00	0.00	0.00	0.01	0.00

Note: Non-Residential Architectural Coating emissions are combined across Aircraft and Non-Aircraft activities